DOCUMENT RESUME

ED 356 379 CE 063 465

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TITLE Collaboration and Cooperation in a Global Community. Annual Meeting of the Association for International Agriculture and Extension Education (9th, Arlington, Virginia, March 18-20, 1993). Conference Proceedings, Volume IX, Number 1.
INSTITUTION Association for International Agriculture and Extension Education.
PUB DATE Mar 93
NOTE 220p.
PUB TYPE Collected Works - Conference Proceedings (021)

EDRS PRICE MF01/PC09 Plus Postage.
DESCRIPTORS *Agricultural Education; Agricultural Production; Comparative Education; *Curriculum Development; Developing Nations; *Extension Education; Farmers; Farm Management; Foreign Countries; *International Education; Marketing; Postsecondary Education; Secondary Education; *Teaching Methods; Vocational Education; Work Attitudes
IDENTIFIERS *Africa; *India; Jamaica; Latin America

ABSTRACT

This conference proceedings presents the following papers: "Some Thoughts on Agricultural Education and Training in a New South Africa" (Bembridge); "Do Zimbabweans Want Agricultural and Extension Education?" (Steele et al.); "Perceived Professional Competencies Needed by Extension Specialists and Agents in Khorasan State of Islamic Republic of Iran" (Pezeshki-Raad et al.); "The Need for a New Approach to Agricultural Higher Education in Latin America" (Sherrard); "Influence of Mexican Agrarian Policy on Rural Outmigration" (Conroy, Ukaga); "Agricultural Supply and Equipment Business and Its Socio-Economic Impacts on a Rural Community...in Mali" (N'Diaye, Lawrence); "Structural Transformaton in the Indian Agrarian Sector" (Radhakrishna, Yoder); "Assessment of the Farming Systems Research/Extension Approach to Technology Transfer among Resource-poor Farmers in the Middle-Belt Region of Nigeria" (Alonge, Martin); "The World's Largest Extension System: Extension in China" (Bartholomew); "Agricultural Extension Problems as Perceived by Extension Officers in Imo State of Nigeria" (Ukaga, Radhakrishna); "Assessment of Motivational Factors Affecting Central and Eastern European Students Participation in Practical Agricultural Exchange Programs" (Jones); "Attitudinal Barriers to Implementing Technological Change in Agriculture in the Former Soviet Union" (McDonald); "Working Together: Alternative Approaches to Technology Development and Adoption in Agriculture" (Acker, Lev); "Title XII Coordinators' Perceptions Regarding Sustainable Agriculture" (Ori, Holt); "Framework for Incorporating Indigenous Knowledge Systems into Agricultural Extension Organizations for Sustainable Agricultural Development in India" (Rajasekaran et al.); "Reaching Malawian Smallholder Farmers with Agricultural Extension Programs: A Case for Increased Use of Women-Farmer Groups" (Sigman et al.); "Collaborating with Industry to Design Agricultural Curricula: A Case Example from Jamaica" (McKenzie, Verma); "Preparing African Agricultural and Extension Educators to Meet Future Challenges...in Kenya, Tanzania, and Swaziland" (Steele et al.); "Role of Vocational Education in the Development of Work Values" (McCracken et al.); "Global Issues" (Ludwig); "Internationalizing Agricultural Curricula" (Ibezim et al.); "Perceptions of Young Farmers Regarding the Role of International Agriculture in Agricultural Education" (Elbasher, Martin); "Access to Information" (Fox, Johnson); "Constraints to and the Potential of India's Farm Science Centers (Krishi Vigyan Kendra-KVK) as Rural Institutions for Agricultural and Rural Education and Development" (Dhanakumar, Compton); and "Potential Contribution of Marketing Concepts for Improving the Effectiveness of International Development Extension Education Programs" (Tyson). (KC)

ED356379

Conference Proceedings

Volume IX Number 1

Ninth Annual Meeting

Association for International Agricultural and Extension Education

A professional association committed to strengthening agricultural and extension education programs and institutions in countries around the world

18, 19, 20 March 1993
Arlington, Virginia
U.S.A.

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The Power of Discussion

Where an organization has been is one bit of evidence of what it is likely to become. Likewise, what is happening today has an influence on what is likely to happen tomorrow. Tomorrow is the only important thing for most of us to be concerned about.

These postulates may or may not be accepted by all. However, if you think about it, the only thing in life most of us have is a chance to change the future. To that end, the activities in which we elect to participate may have powerful ramifications for our profession in Agricultural and Extension Education.

AIAEE is a young organization looking at an old concept from a worldwide perspective. The annual meeting, which is reflected in these proceedings, is one group's attempt to influence the shape of tomorrow. Members of the organization are not content to react to the world someone else has shaped. They are actively engaged in sharing, questioning, and supporting each other to identify practices and procedures that are important to the future of programs in agricultural and extension education.

These proceedings are evidence that agricultural and extension education is a dynamic profession whose work has only begun. Professionals are continuing to learn from each other so they can contribute to developing a world that is healthy and productive for all.

Frank Bobbitt
1992-93 AIAEE President

1993 Conference Proceedings
Association for International Agricultural and Extension Education

Volume IX Number 1

Theme: Collaboration and Cooperation in a Global Community

18, 19, 20 March 1993
Arlington, Virginia

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Association for International Agricultural and Extension Education

ANNOUNCES
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for
Ninth Annual Conference of AIAEE

at
Arlington, Virginia

on
18, 19, 20 March 1993

Three copies of a presentation **summary** related to international agricultural and extension education issues should be submitted. Summary should not exceed three double spaced pages. The presentation summary may be either research-based and/or philosophical-based and should include the following:

- **Title Page with name(s) and address(es) of author(s)**
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Deadline for submission of presentation summaries for review is **1 December 1992.**

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Authors of papers accepted by the referees for presentation will be notified and paper specifications mailed to them prior to the 1993 AIAEE Annual Conference.

Procedure for Selecting Refereed Papers at the 1993 AIAEE Annual Conference of AIAEE

Step	Activity	Ways & Means
1	Call for Papers	Announce in the "INFORMER"
2	Papers received at Penn State University	Scholarly Activity Committee responsible for collecting proposals
3	Paper Summary Review	a. Each paper numbered consecutively as received. b. Each paper assigned to two referees c. Each referee will receive a copy of the paper summary accompanied with a "Scorecard for AIAEE Presentations" d. Referees review the paper e. Referees return papers summaries to Scholarly Activities Committee Chair with completed scorecards by 1 February 1993
4	Tabulate paper summary scorecards	a. Two rejects = paper rejected b. One reject and one accept = paper alternate c. Two accepts = paper accepted
5	Notify author(s) of paper status	Scholarly Activity Committee Chair
6	Prepare Journal of Proceedings	Authors notified of paper acceptance by Scholarly Activity Committee Chair

* Adopted from the 1992 Scholarly Activities Committee Report , "Proposed Procedure for Selection of Refereed Papers at AIAEE/ISEE Conference" chaired by Dr. Arlen Etling.

THANK YOU!

The membership of the Association of International Agricultural and Extension Education wish to express their appreciation to these colleagues shown on Table 1 who agreed to serve as referees for the paper summaries submitted for the 1993 AIAEE Annual Meeting at Arlington, VA. Twenty one (21) colleagues from 15 different Universities from across the United States of America served as referees. Each paper submitted was reviewed by at least two referees. There were a total of 51 paper summaries submitted and refereed with 24 (47%) being accepted for presentation.

Table 1. Professional Paper Referees for the 1993 Annual Meeting of Association for International Agricultural and Extension Education.

Referee	University
Robert Agunga	Ohio State University
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Dennis Eaton	Penn State University
Stephen Jones	University of Minnesota
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Edgar A. Persons	University of Minnesota
Gholamreza Pezeshki-Raad	Penn State University
Warren Prawl	Kansas State University
William L. Thuemmel	University of Massachusetts
Satish Verma	Louisiana State University
Nancy J. Walker	Penn State University
Randol Waters	University of Tennessee
Benjamin Weddle	University of New Hampshire
Herschel Weeks	Oregon State University

THANK YOU! THANK YOU! THANK YOU! THANK YOU! THANK YOU!

The membership of the Association of International Agricultural and Extension Education wish to express their thanks and appreciation to these colleagues shown on Table 2 who agreed to serve as either chairpersons, discussants or facilators for the concurrent sessions at the 1993 AIAEE Annual Meeting at Arlington, VA. Twenty four colleagues from eleven different universities worked together to cause the 1993 concurrent sessions to be a success. Again, thank you.

Table 2. Professional Paper Chairpersons, Discussants and Facilators for the Concurrent Sessions at the 1993 Annual Meeting of Association for International Agricultural and Extension Education.

Chairpersons	University
William L. Thummel	University of Massachusetts
Nancy J. Walker	Pennsylvania State University
Gary White	Iowa State University
Barbara G. Ludwig	Ohio State University
Dennis Eaton	Pennsylvania State University
Anne M. Fox	Oregon State University
Gholamreza Pezeshki-Raad	Pennsylvania State University
David G. Acker	Oregon State University
Discussants	
Janet Henderson	Ohio State University
Thomas Trail	Washington State University
Layle D. Lawrence	West Virginia State University
Robert A. Martin	Iowa State University
Tony J. Warner	University of Minnesota
Kathy E. Colverson	State University of New York
Satish Verma	Louisiana State University
Arlen W. Etling	Pennsylvania State University
Facilators	
Curtis D. Norenberg	University of Minnesota
Laith Rousan	Ohio State University
Don King	Iowa State University
Michael Cote	Ohio State University
Ray Ostos	New Mexico State University
Abdillani Alawy	Ohio State University
Paul Crovella	State University of New York
Jaime Castillo	New Mexico State University

Association for
International Agricultural
and Extension Education

1993 Annual Conference

Concurrent Sessions

Schedule

for

Refereed Papers

18, 19, 20 March 1993

Howard Johnson's/National Airport
Arlington, Virginia
United States of America

Session A	**AGRICULTURAL & EXTENSION EDUCATION NEEDS**
Chairperson	William L. Thuemmel, University of Massachusetts
Date	19 March 1993 Time: 8:00 - 9:30
Venue	Patten Room (E Level)
Discussant	Janet Henderson, Ohio State University
Facilitator	Curtis D. Norenberg, University of Minnesota

Paper #1. **DO ZIMBABWEANS WANT AGRICULTURAL AND EXTENSION EDUCATION?**
by
Roger E. Steele, Olivia N. Muchena, and M. B. K. Hakutangwi
Winrock International Institute for Agricultural Development

Paper #2. **PERCEIVED PROFESSIONAL COMPETENCIES NEEDED BY EXTENSION SPECIALISTS AND AGENTS IN KHORASAN STATE OF ISLAMIC REPUBLIC OF IRAN**
by
Gholamreza Pezeshki-Raad, Edgar P. Yoder, and James E. Diamond
Penn State University

Paper #3. **THE NEED FOR A NEW APPROACH TO AGRICULTURAL HIGHER EDUCATION IN LATIN AMERICA**
by
Daniel Sherrard
Iowa State University

Session B	**AGRARIAN POLICY INFLUENCES**
Chairperson	Gary White, Iowa State University
Date	19 March 1993 Time: 8:00 - 9:30
Venue	Munroe Room (E Level)
Discussant	Thomas Trail, Washington State University
Facilitator	Laith Rousan, Ohio State University

Paper #1. **INFLUENCE OF MEXICAN AGRARIAN POLICY ON RURAL OUTMIGRATION**
by
Carol A. Conroy and Okachukwu M. Ukaga
Penn State University

Paper #2. **AN AGRICULTURAL SUPPLY AND EQUIPMENT BUSINESS AND ITS SOCIO-ECONOMIC IMPACTS ON A RURAL COMMUNITY: A CASE STUDY IN MALI**
by
Ibrahim N'Diaye and Layle D. Lawrence
West Virginia University

Paper #3. **STRUCTURAL TRANSFORMATION IN THE INDIAN AGRARIAN SECTOR: IMPLICATIONS FOR EXTENSION PROGRAM DEVELOPMENT**
by
Rama B. Radhakrishna and Edgar P. Yoder
Penn State University

Session C	**ASSESSMENT OF EXTENSION SYSTEMS**
Chairperson	Barbara G. Ludwig, Ohio State University
Date	19 March 1993 Time: 8:00 - 9:30
Venue	Schwartekosf Room (Lobby Level)
Discussant	Layle D. Lawrence, West Virginia University
Facilitator	Don King, Iowa State University

Paper #1. **AN ASSESSMENT OF THE FARMING SYSTEMS RESEARCH/EXTENSION APPROACH TO TECHNOLOGY TRANSFER AMONG RESOURCE-POOR FARMERS IN THE MIDDLE-BELT REGION OF NIGERIA**
by
Adewale Johnson Alonge and Robert A. Martin
Iowa State University

Paper #2. **THE WORLD'S LARGEST EXTENSION SYSTEM "EXTENSION IN CHINA"**
by
Henry M. Bartholomew
Ohio State University Cooperative Extension Service

Paper #3. **AGRICULTURAL EXTENSION PROBLEMS AS PERCEIVED BY EXTENSION OFFICERS IN IMO STATE OF NIGERIA**
by
Okechukwu M. Ukaga and Rama B. Radhakrishna
Penn State University

Session D	**CENTRAL AND EASTERN EUROPE ISSUES**
Chairperson	Anne M. Fox, Oregon State University
Date	19 March 1993 Time: 8:00 - 9:30
Venue	Puller Room (Lobby Level)
Discussant	Robert A. Martin, Iowa State University
Facilitator	Michael Kote, Ohio State University

Paper #1. **AN ASSESSMENT OF MOTIVATIONAL FACTORS AFFECTING CENTRAL AND EASTERN EUROPEAN STUDENTS PARTICIPATION IN PRACTICAL AGRICULTURAL EXCHANGE PROGRAMS**
by
Stephen P. Jones
Minnesota Extension Service

Paper #2. **ATTITUDINAL BARRIERS TO IMPLEMENTING TECHNOLOGICAL CHANGE IN AGRICULTURE IN THE FORMER SOVIET UNION**
by
Amy McDonald
Texas A&M University

Paper #3. **WORKING TOGETHER: ALTERNATIVE APPROACHES TO TECHNOLOGY DEVELOPMENT AND ADOPTION IN AGRICULTURE**
by
David G. Acker and Larry S. Lev
Oregon State University

Session E	**SUSTAINABLE AGRICULTURE**
Chairperson	Nancy J. Walker, Penn State University
Date	20 March 1993 Time: 8:00 - 9:30
Venue	Patten Room (E Level)
Discussant	Tony J. Warner, University of Minnesota
Facilitator	Ray Ostos, New Mexico State University

Paper #1. **TITLE XII COORDINATORS PERCEPTIONS REGARDING SUSTAINABLE AGRICULTURE**
by
Lydia Ori and Barbara A. Hold
Louisiana State University

Paper #2. **A FRAMEWORK FOR INCORPORATING INDIGENOUS KNOWLEDGE SYSTEMS INTO AGRICULTURAL EXTENSION ORGANIZATIONS FOR SUSTAINABLE AGRICULTURE DEVELOPMENT IN INDIA**
by
B. Rajasekaran, Robert A. Martin, and D. Michael Warren
Iowa State University

Paper #3. **REACHING MALAWIAN SMALLHOLDER FARMERS WITH AGRICULTURAL EXTENSION PROGRAMS: THE CASE FOR INCREASED USE OF WOMEN-FARMER GROUPS**
by
Vickie A. Sigman, Catherine Chibwana and Isabel Matenje
Idaho State University

Session F	**FORMAL EDUCATION CURRICULUM**
Chairperson	Dennis Eaton, Penn State University
Date	20 March 1993 Time: 8:00 - 9:30
Venue	Munroe Room (E Level)
Discussant	Kathy E. Colverson, State University of New York/Morrisville
Facilitator	Abdillani Alawy, Ohio State University

Paper #1. **COLLABORATING WITH INDUSTRY TO DESIGN AGRICULTURAL CURRICULA: A CASE EXAMPLE FROM JAMAICA**
by
James McKenzie, Jamaica College of Agriculture and Satish Verma
Louisiana State University

Paper #2. **PREPARING AFRICAN AGRICULTURAL AND EXTENSION EDUCATORS TO MEET FUTURE CHALLENGES: AN ANALYSIS OF UNIVERSITY PROGRAMS IN KENYA, TANZANIA, AND SWAZILAND**
by
Roger E. Steele, C.A. Onyango, K.J.B. Keregero, B.M. Dlamini
Winrock International Institute for Agricultural Development

Paper #3. **ROLE OF VOCATIONAL EDUCATION IN THE DEVELOPMENT OF WORK VALUES: A CROSS-CULTURAL DISCUSSION**
by
J. David McCracken, Ana E. Falcon-Emmanuelli and Zakaria bin Kasa
Ohio State University

Session G	**INTERNATIONALIZING DOMESTIC PROGRAMS**
Chairperson	Gholamreza Pezeshki-Raad, Penn State University
Date	20 March 1993 Time: 8:00 - 9:30
Venue	Schwartekost Room (Lobby Level)
Discussant	Satish Verma, Louisiana State University
Facilitator	Paul Crovella, State University of New York/Morrisville

Paper #1. **GLOBAL ISSUE - IDENTIFYING EXISTING ATTITUDES OF AGRICULTURAL AND METROPOLITAN LEADERS**
by
Barbara G. Ludwig
Ohio State University

Paper #2. **INTERNATIONALIZING AGRICULTURAL CURRICULA: ARE WE TEACHING THE CONCEPTS IN OUR SECONDARY SCHOOL AGRICULTURAL PROGRAMS?**
by
Don O. Ibezim, J. David McCracken, and Janet L. Henderson
Ohio State University

Paper #3. **PERCEPTIONS OF YOUNG FARMERS REGARDING THE ROLE OF INTERNATIONAL AGRICULTURE IN AGRICULTURAL EDUCATION**
by
Kamal Ali Elbasher and Robert A. Martin
Iowa State University

Session H	**METHODS OF DISSEMINATING INFORMATION**
Chairperson	David G. Acker, Oregon State University
Date	20 March 1993 Time: 8:00 - 9:30
Venue	Puller Room (Lobby Level)
Discussant	Arlen W. Etling, Penn State University
Facilitator	Jaime Castillo, New Mexico State University

Paper #1. **ACCESS TO INFORMATION: LIBRARY SUPPORT FOR INTERNATIONAL DEVELOPMENT**
by
Anne Fox and Peggy Johnson
Oregon State University

Paper #2. **CONSTRAINTS TO AND THE POTENTIAL OF INDIA'S FARM SCIENCE CENTERS AS RURAL INSTITUTIONS FOR AGRICULTURAL AND RURAL EDUCATION AND DEVELOPMENT**
by
V.G. Dhanakumar
University of Wisconsin-Madison

Paper #3. **THE POTENTIAL CONTRIBUTION OF MARKETING CONCEPTS FOR IMPROVING THE EFFECTIVENESS OF INTERNATIONAL DEVELOPMENT EXTENSION EDUCATION PROGRAMS**
by
C. Ben Tyson
University of Connecticut

Invited Papers

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SOME THOUGHTS ON AGRICULTURAL EDUCATION AND TRAINING IN A NEW SOUTH AFRICA

T.J. Bembridge

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University of Fort Hare, Private Bag X1314, Alice, South Africa

1. INTRODUCTION

The most pressing problem identified at the 1975 and 1987 conferences on Resources of Southern Africa was the development of human resources, with particular reference to education and training (Bembridge, 1987a). The overall need for education in Southern Africa is apparent when one looks at the education levels of South Africa's workforce of over 11 million people. Three in ten (30%) of the workforce have no education at all; 36% have primary school only, and 31% secondary schooling. Only 3% have post matric tertiary education. It is estimated that 45% of all black South Africans are illiterate (Standard Bank, 1990).

One has only to look at countries such as Japan, Taiwan and South Korea. These countries owe their economic success to well planned education systems. The provision of equal and adequate educational opportunities is fundamental to the future economic success of the agricultural industry. To achieve equality and quality in South African agricultural education a fundamental change in structure and philosophy will be needed at educational, economic and socio-political level. With ever increasing financial restrictions and imminent socio-political changes there is a need for planning priorities and clear guidelines for an education system to service the agricultural industry of the New South Africa. Agricultural education will need to change more in the next decade than it has since tertiary agricultural training institutions were first created in South Africa.

There is no doubt that the achievements of agricultural tertiary level education have been considerable, especially when viewed against the fact that the annual production increase of 3,7% over the past 30 years has managed to exceed the high population growth rate of 2,5%, with export earnings today worth approximately R4 900 million (Agricultural Research Council, 1992). However, in the developing areas, despite considerable investment in agricultural and rural development, so much of these areas are still characterised by poverty, inequality of opportunity, and environmental degradation (Bembridge, 1990).

In this paper a brief overview of the present agricultural education situation is followed by some thoughts on future needs and directions.

2. THE PRESENT SITUATION

2.1 The South African Agricultural Industry

At present, there is a dichotomy in the South African agricultural industry. On the one hand, there is a fairly prosperous and progressive commercial farming sector in terms of technology levels, with approximately 55 000 farmers (numbers are declining), and a similar number of smallholders (±55 000), providing employment for 1,2 million workers (Venter and Kritzinger, 1992).

Alongside this sector, there is a small-scale farming sector in the developing areas comprising the TBVC and self-governing States, with some 1,25 million households using 17% of the land. Of these, approximately 3 100 farmers make a living from farming. Secondly, there are 238 000 (13%) progressive small-scale farming households who adopt some recommended technology and sell some produce and/or livestock, but who usually do not produce all the basic food needs for their families. These include farmers on irrigation and other agricultural development projects. Thirdly, there are over 1 million small-scale landholders with below subsistence production levels who do not usually sell any crops or livestock. Finally, there are over 500 000 households who only have a residential site without access to arable land and do not own any cattle (Bembridge, 1990). Previous land tenure legislation (now repealed)and the lack of adequate institutional support for agricultural development has prevented the emergence of a class of entrepreneur farmers in the developing areas.

2.2 Agricultural training institutions serving both sectors

Agricultural training needs of the agricultural industry are served by agricultural High Schools, Agricultural Colleges, Technikons and Universities, as well as technical colleges and non formal education centres. Some of our institutions tend to have little contact or influence from their external environment.

2.2.1 **High Schools**

There are 16 agricultural high schools, serving the commercial sector. The aim is to provide farmers' sons and others with the opportunity of learning something about agriculture, which may lead to tertiary level education. In the developing areas, the 6 agricultural high schools aim to attract pupils who will take up agricultural careers. Due to their good facilities and teachers, these schools have become elitist, with approximately 10% of their pupils aspiring to careers in agriculture, which is not an unsatisfactory situation.

In addition to agricultural high schools, agriculture is offered as a matric subject at many rural high schools in the developing areas. However, the failure rate is very high - 75% for higher grade.

2.2.2 **Agricultural Colleges**

There are 7 colleges in the commercial sector offering a 2 year diploma, mainly aimed at training future farmers and farm managers. These Colleges have high calibre teaching staff and good facilities. In the developing areas, there are now 4 colleges (previously 6) which provide for a 3 year diploma course training in agricultural extension, animal health, farm management, home economics and nature conservation, for the civil service, development corporations and, to some extent, NGOs. Although the situation is improving, these Colleges tend to lack adequate numbers of professionally trained staff and facilities, with the result that at some colleges students do not have the necessary practical and theoretical knowledge to fulfil their roles satisfactorily.

An encouraging development with regard to agricultural colleges, was the recent formation of an association of agricultural college principals, and a move to amend legislation so that the Technikon Certification Council could be broadened to include all agricultural colleges. In due course, all colleges will offer 3 year nationally recognised diploma training for practical agriculturalists to serve all sectors of the industry.

2.2.3 **Technikons**

The 8 Technikons offering agricultural training serve mainly the commercial sector. They provide national diploma level training in various directions for agricultural technicians for the government service and the private sector. Some technical colleges provide training in mechanisation and farm management.

2.2.4 **Universities**

At graduate level, there are 4 universities, which traditionally produce 4 year BSc graduates to serve mainly the commercial farming sector in one way or another. Up to now, the five universities in the developing areas have mainly produced graduates to fill posts in the government and agricultural corporations and, to a limited extent, the private sector. The universities in the developing areas have difficulty in attracting high calibre students, due to the poor image of agriculture in these areas.

2.2.5 **Non formal education**

Agricultural Colleges serving the commercial sector run periodic short courses for farmers and managers. The Boskop training centre offers skills training for farm workers particularly tractor driving, machinery maintenance, and wool classing.

The main training input for small-scale farmers in the developing areas is through agricultural extension services. Evaluation studies carried out in these areas show that generally extension services are not efficient or effective and only reach a small percentage of farmers (Bembridge, 1987). Agricultural departments and development corporations have a number of training centres which tend to be under-utilised. In addition there are a number of private sector Training Trusts and other institutions offering various skills training. In general, non formal training is unco-ordinated and often not related to specific programmes.

2.3 **Output of students from colleges and universities**

At the four universities serving the commercial sector, there is a trend towards specialisation to meet the needs of more intensive and high technology agriculture. Almost half of the total of 620 graduates in 1990 were for higher degrees. The four universities in South Africa produce ten times as many graduates per year (±290) as produced at the five universities in the developing areas. The number of graduates produced in South Africa exceeds the demand in the commercial sector. However, these graduates could be used to supplement the annual needs in the developing areas. A point of concern is that ±75% of graduates in the developing areas complete a three year B Agric degree as opposed to a 4 year BSc degree. This is a reflection of the lack of mathematics and science teaching in Black schools, particularly in the rural areas.

With regard to diplomates, the number of diplomates from the colleges in the developing areas have declined due to the closure of one College and another becoming part of the Pretoria Technikon. The numbers of diplomates from technikons and agricultural colleges are sufficient to provide for employment needs in government and the private sector. However, it can be argued that there can never be enough diplomates at farmer level.

A general criticism of formal tertiary agricultural education is that it is based on a "subject" approach, which tends to favour rote learning.

2.4 Distribution of graduates and diplomates

There is an imbalance in intellectual investment between the commercial and developing area sectors in terms of number of graduates. In the developing areas, there is an acute shortage of graduate subject-matter-specialists, trainers and managers. Due to financial constraints it is difficult to ascertain the present annual requirements in the developing areas. With the restructuring of agriculture, there will be a redistribution of manpower in both sectors.

2.5 Education levels of farmers

In considering educational needs, one has to know what the existing levels of education of South African farmers are. At present, 61% of farmers in the commercial farming sector have a tertiary level education (Venter and Kritzinger, 1992). In the developing areas, one-third of farmers are illiterate, while only 2% have a secondary education (Bembridge, 1990).

2.6 Types of farming enterprises

Educational needs are also determined by the types of farming enterprises. In this regard, it needs to be stressed that statistics in the developing areas are unreliable. Therefore, the statistics provided in Table 1 are an approximation. There is a good balance between crops, animals and horticultural crops in both sectors. This reinforces the need to train good practical agriculturalists, especially at college level.

Table 1 Estimated numbers of farmers ascending to enterprise in the commercial and developing sectors

ENTERPRISE	FARMER CATEGORY	
	COMMERCIAL*	SMALL-SCALE**
Field Crops	72 628	1 170 000
Animal Production	64 235	702 000
Horticulture	18 479	300 000

* After Burger, 1992; ** After Bembridge, 1990.

2.7 Levels of agricultural production

Available data on crop production yields shows wide disparities between the commercial sector and the developing areas. For example, maize yields in the commercial sector are about five times greater than in the developing areas. Similarly, levels of productivity of cattle, sheep and goats for both meat and milk are far below the average standards of the commercial farming sector (Bembridge, 1990). Suffice to state that there is a large technology gap between the two sectors.

3. SOME FUTURE CONSIDERATIONS

3.1 A case for rationalisation of university level training

It is doubtful whether nine faculties of agriculture, especially five in the developing areas, are needed to satisfy the training needs in both agricultural sectors. Bearing in mind the need to differentiate in accordance with regional needs, not more than five or six agricultural faculties would be needed to ensure an equitable distribution of resources on a national basis.

Economic realities are forcing universities to be introspective. They need to find ways of providing more cost effective education (Meissner, 1990). Presently it costs ± R24 000 per annum to produce one graduate student. One way of saving is through inter-university or inter-departmental rationalisation.

In the developing areas, there are several advantages of rationalisation. Firstly, the present set-up has little potential for growth, in view of the increasing competition for scarce financial and human resources, in terms of their contribution to research and improved teaching. Secondly, stronger departments, with a pool of knowledge, will lead to better teaching. Thirdly, by pooling expertise, financial resources and facilities, long term research problems can be addressed. Finally, strong departments, with pooled expertise, will attract research funds and play a greater role in serving the rural communities.

3.2 Future training requirements

South Africa needs to develop a non-racial integrated agricultural training strategy aimed at creating equal opportunities for all sectors of the industry. The agricultural education system should accommodate basic academic education, as well as technical and practical skills training. There is no need to develop more training institutions.. The need is to rationalise and adapt present institutions to the needs of the industry especially in meeting the needs of future Black farmers and farmers not qualified to enter present tertiary level institutions. There is a need to continue present graduate and specialised post-graduate University level training on a rationalised basis to meet the needs of academic institutions, research and subject-matter specialists in the commercial and developing areas. To make best use of scarce resources there is a need to rationalise and co-ordinate teaching and research programmes between faculties and departments in accordance with the needs of the agricultural industry.

Technikons appear to be meeting the needs for technician training for both the developing and commercial sectors, as well as providing training for some future farmers. There appears to be a need to consider rationalisation of technikon courses in accordance with national and regional needs.

There are sufficient agricultural colleges to cater for the needs of agricultural extension, animal health, home economics and other field workers for employment in the public service, corporations and private sector organisations. However, there is a strong argument that there can never be enough farmers trained at diploma level.

The agricultural education and training needs of the private sector, including co-operatives, and input supply firms, are adequately catered for by Universities, Technikons and Colleges.

Schools, especially in rural areas of the developing areas, need to adopt more relevant curricula and upgrade agricultural teachers through in-service training, as well as upgrade facilities.

Future commercial farmers with the relevant entry qualifications already have areas to university, technikon and college training. At present there is no specific provision for the training of future Black farmers, nor for aspiring farmers who do not have entry qualifications to present tertiary institutions.

There is a need to introduce one year certificate courses, or a series of courses providing credit towards a certificate for all sectors. The emphasis on training should be technical skills, financial, personnel and mechanical management, as well as marketing (Burger, 1992). Possibly one or two of the present colleges could be adapted to specialise in such training, while others could adapt programmes to run such courses in parallel with diploma level training.

The main thrust of training in the developing areas should be through restructuring and upgrading present extension services, to ensure that linkages with research and adaptive research programmes function effectively on a regional basis. Newly formed Agricultural Development Centres should act as a focal point for adaptive research and training programmes. Particularly on capital intensive projects, training of small-scale farmers should be accompanied by functional numeracy and literacy programmes.

Practical skills training for farm workers offered at the Boskop training institute needs to be expanded and extended to include present and future Black farmers, possibly in liaison with some of the agricultural colleges.

Training of farmers wives has been neglected in all sectors (Burger, 1992). In the commercial sector there is a need to train farmers wives in bookkeeping and financial management, while in the developing areas the need is for training in grain production, home gardens and small-scale management with the emphasis on cheap food production.

3.3 Institutional reform

If our agricultural universities, technikons and colleges are to continue to develop and serve the future agricultural needs of the country, there are a number of issues common to many parts of the world which need to be changed (Bawden and Busch, 1989).

Each institution needs to have a clear written statement of its mission, activities, aims and objectives. Some already have.

There is a need for each institution to consider its role in the overall development of the region in which it is located, as well as the country as a whole.

No matter what system of management a university or college may have, leadership is an essential component of its functioning. There is a need to develop and encourage professional leadership by encouraging and rewarding staff members and students.

Environmental issues are becoming of increasing national concern. There is a need to reorientate programmes and curricula to integrate environmental concerns into ongoing teaching, research and extension programmes.

There is a need for Universities and Colleges to adapt their curricula to focus more on the diversity of knowledge and skills needed for employment in the public and private sectors, commercial farming and small-scale farming. Here thought needs to be given to institutions specialising in different aspects of training in relation to regional and national needs.

An important consideration in curriculum development is to provide for credit transfer between universities, colleges and technikons, especially upward mobility for students showing high potential.

The most effective institutions are those with strong linkages with various other organisations. These active inter-relationships involve extension and related services, farmer organisations, input suppliers, output processors, the ministry of agriculture,livestock organisations, education, planning and finance.

A central feature in reorganising our university and college environment must be strong linkages with extension services to feed information into the institution concerned. By this is not meant feedback on adoption of innovations by farmers, but translation of farmers' needs into researchable topics. The move towards developing adapted farming systems is one way of achieving this. In short, farmers must be taken seriously as partners in the development process.

Although a number of universities and agricultural colleges are playing some role in continuing education through refresher and other specific courses, there is a need for co-ordination, rationalisation and strengthening of this important activity.

3.4 Educational focus

The new challenge for agricultural universities and colleges is to move from a focus on food production to that of sustainable and productive rural development.

Agriculture needs to move away from a commodity focus to an emphasis on the development of new agricultural systems. Agricultural systems include not only merely the production of agricultural commodities, but their integration with other key activities of the farm household, including markets for their sale, facilities for their processing, the delivery of farm inputs, the availability of credit, the formulation of national resource and agricultural policies and measures of effective demand. Thinking needs to shift from a focus on the parts to a "focus on the whole". Knowledge about how the parts fit together is just as important as knowledge about the parts themselves.

Restructuring agricultural universities and colleges to meet these new challenges requires consideration of new ways of knowing as well as new kinds of knowledge and its diffusion (Bawden, 1988). For example, there is now a whole range of new theories on knowledge. There have been major changes in cognitive theory, the theory of research, and philosophy of science. To improve teaching methods academics need to be supported by education and cognitive specialists in designing and teaching courses to ensure the large majority of students are well taught, with the emphasis on the How of practical agriculture.

Such a change in perspective means that the agricultural universities and colleges should no longer be seen simply as places where knowledge is created by scientists, handed to students and extension workers, and in turn passed on to farmers. They need to develop new approaches, new curricula, new paradigms, new theories and new practices based on the active participation of staff members, students, extension workers, the private sector, farmers, and others about the real issues faced by the agricultural and rural sector.

The problems and responsibilities facing all agricultural universities and colleges are such that they can only succeed if they become proactive in seeking to restructure their own environment, so as to ensure the success of their mission. This requires rethinking the way in which agricultural universities and colleges function, so as to make impacts rather than outputs the criteria for success. This will involve scientists from the natural, social and ecological sciences working together with each other and with their co-learning farming communities.

A people centred paradigm for "rural development" demands a student centred curricula, and farmer centred research and extension (Bawden and Macadam, 1988, p.2).

The current "content" approach to curricula tends to lead to rote learning. Where a student is educated through the medium of conceptual learning such a student is given the means to become a scientifically oriented thinking person with the ability to solve problems.

The education focus should be based on a "profile of competence", rather than exposure to "bodies of specific knowledge" or "mastery of specific skills" of husbandry or research methods (Bawden and Macadam, 1988).

4. SUGGESTED FUTURE DIRECTIONS

Agricultural universities and colleges, particularly those training people to work in the developing areas, must be deeply integrated in the development process. As repositories of problem solving resources, as well as teaching skills, agricultural faculties, technikons and colleges are not adequately used. This tends to lead to lack of relevance in certain aspects of the curriculum and inadequate education of the much needed manpower for development. Six directions are proposed for universities and colleges in the future:

- More involvement in rural development, from working in the rural areas to participation in policy-making for regional and national development;
- central curriculum for colleges, technikons and certificate training with provision for regional variation in accordance with community needs;
- improved teaching quality, even if quantity suffers;
- play a leadership role in the national agricultural education/training system, including intermediate and in-service training;
- recognised centrality of both the universities' or colleges' own research and the training and co-operation with extension and subject-matter specialists; and
- regional and inter-regional collaboration among institutions, as they exist, and as they might agree on shared specializations.

In short, universities and colleges need to be deeply involved in the development process (Mallouf, 1988). They should rationalise teaching and re-orientate their programmes and curricula towards the development needs of the rural people of Southern Africa, and especially those of the small-scale black farmers, disadvantaged groups and future farmers of all population groups.

5. CONCLUSION

The survival and prosperity of our agricultural training institutions requires the adaption of a new convenant, a commitment to be scientifically excellent, socially relevant and ecologically responsible. The agricultural development and education process should be centred on people rather than on production per se.

A key feature of such change is political support from the national and future regional governments which will permit our tertiary agricultural training institutions to develop into pro-active organisations. This will require the institution of planning and co-ordination mechanisms for all levels of agricultural education involving all role players.

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Session A

AGRICULTURAL & EXTENSION EDUCATION NEEDS

Paper #1. **DO ZIMBABWEANS WANT AGRICULTURAL AND EXTENSION EDUCATION?**
by
Roger E. Steele, Olivia N. Muchena, and M. B. K. Hakutangwi
Winrock International Institute for Agricultural Development

Paper #2. **PERCEIVED PROFESSIONAL COMPETENCIES NEEDED BY EXTENSION SPECIALISTS AND AGENTS IN KHORASAN STATE OF ISLAMIC REPUBLIC OF IRAN**
by
Gholamreza Pezeshki-Raad, Edgar P. Yoder, and James E. Diamond
Penn State University

Paper #3. **THE NEED FOR A NEW APPROACH TO AGRICULTURAL HIGHER EDUCATION IN LATIN AMERICA**
by
Daniel Sherrard
Iowa State University

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Do Zimbabweans Want Agricultural and Extension Education?

Paper presented at the Ninth Annual Conference of the
Association for International Agricultural
and Extension Education (AIAEE)
March 18-21, 1993
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Introduction

Of all the countries in Africa, Zimbabwe has one of the best opportunities to successfully combine the ingredients necessary for sustainable development. One of Zimbabwe's most dynamic and complex sectors is agriculture. Development of agriculture requires increasingly sophisticated and innovative approaches to agricultural education and agricultural extension.

Since independence in 1980 the Government of Zimbabwe has promoted the concept of "education with production" in the primary and secondary school curriculum. One of the stated objectives is to equip the school pupils with basic knowledge and skills of production for individual and community development. Principles of agricultural production, including crops and livestock, are important areas of emphases in the curriculum.

Agriculture is now taught at both primary and secondary schools in Zimbabwe; being an examinable subject in over 1000 schools. Therefore, the demand for trained people to service the agricultural training needs in the school system has greatly increased. Currently there is a shortage of trained teachers in Zimbabwe.

Zimbabwe also has large agricultural extension sector that has considerable needs for well-trained extension educators. The Government of Zimbabwe's agricultural extension service, Agritex, has one of the most advanced effective in-service training and outreach programs of any government extension service in Africa. It is also noteworthy that there are active nongovernmental agricultural sector in Zimbabwe that provides supplemental service to meet agricultural development needs of some of the poorest members of the population. In addition, there is a commercial farming and agribusiness sector in Zimbabwe providing direct interaction with farmers. Each sector suffers from a shortage of trained agricultural and extension educators.

The problem of a shortage of trained agricultural and extension educators in Zimbabwe is not sufficiently addressed by the universities or other educational institutions. At present, there is no opportunity for students in Zimbabwe's universities to adequately prepare for a career that requires both pedagogical and technical agriculture skills. The University of Zimbabwe provides training in Adult Education, Teacher Education, and in the technical disciplines of Crop Science, Soil Science, Agricultural Engineering, and Animal Science. However, there is no way for a student to get both the educational qualifications and a solidly-grounded technical preparation in general agriculture.

Purpose of Paper

This paper is the report of a two-phase study conducted for the Dean, Faculty of Agriculture at the University of Zimbabwe. The study was completed in 1992 and involved: (1) a baseline needs analysis of supply and demand for agricultural education and extension education graduates in Zimbabwe; and (2) an investigation of the feasibility for implementation of degree programs in agricultural and extension education at the University of Zimbabwe.

Methods and Data Sources

Phase I, the needs analysis for supply and demand, was undertaken by a study team consisting of a University of Zimbabwe staff member, an international agricultural education consultant, and a staff member from the Ministry of Lands, Agriculture, and Rural Resettlement. Methodologies included identification of relevant literature and collection of information from numerous sources, both in Zimbabwe and internationally. Other phase I activities included interviews with principals of agricultural colleges and institutes; interviews with other public and private sector employers of graduates; government officials; and university academic staff. Visits were also made, for comparative purposes to agricultural education and agricultural extension programs in Kenya, Tanzania, Swaziland, and Australia.

Phase II revolved around the convening of a symposium involving 28 participants from various Zimbabwe sectors and 3 external consultants from other African countries. Symposium participants helped to clarify issues, set priorities, and act as a sounding-board for the Phase I report presented by the study team. Participants at the symposium were divided into seven working groups to develop details of the content, structure, and linkages necessary for considering the feasibility of a new agricultural and extension education academic program. Members of the symposium were chosen from the following institutions or sectors:

+ University of Zimbabwe's Faculty of Agriculture
+ University of Zimbabwe's Faculty of Education
+ Ministry of Lands, Agriculture, and Rural Resettlement
+ Ministry of Education and Culture
+ Ministry of Higher Education
+ Agritex Training Branch
+ Agricultural Colleges
+ Agricultural Institutes
+ Research and Specialist Services
+ Nongovernmental organizations
+ Private agribusiness
+ Parastatals
+ Farmer Organizations

The goals of the symposium were:

- to provide a reflective response to the findings of the agricultural and extension education feasibility study;
- to generate final recommendations for the Dean, Faculty of Agriculture;
- to create a forum for dialogue and interaction between professional agricultural and extension educators in Zimbabwe (and other African countries); and
- to provide an opportunity for action between various university, government ministry, and nongovernmental representatives at the symposium.

The Study Team and Consultants Made Recommendations

The symposium utilized the expertise of participants by placing them in seven working groups to consider the findings presented by the study and consultant teams. Study findings were presented by the study team members. Supporting papers containing background information on programs in Tanzania, Swaziland, and Kenya were presented by outside consultants. Membership of each working group was strategically selected by the symposium organizers to insure a diversity of opinions in each group. Groups were tasked to consider the recommended content, structure, and linkages necessary for agricultural and extension education programs. Oral reports from each working group session were presented to the larger symposium group for consideration and response. The ideas arising from the working group sessions, combined with results from the needs analysis for supply and demand, were utilized by the study and consultant team in preparing the following recommendations.

A BSc option in AEE should be started at the University of Zimbabwe

Agricultural education and extension (AEE) is defined as the scientific study of principles and methods, both formal and nonformal, of teaching and learning as they pertain to agriculture. Employment of a cadre of qualified personnel who can create the conditions for a sustainable agriculture system, resulting in production of food to meet the needs of the community and nation is the desired outcome. AEE should enhance knowledge, skills, and attitudes development and utilization for agriculture. Fostering research into the dissemination and assimilation of appropriate agricultural knowledge is also important.

The younger generation must be helped to appreciate the value of agriculture, not to look down on it as an inferior profession. The affective domain of values and attitudes, even though difficult to teach, must be increasingly taught to young Zimbabweans. The general objective of AEE is to change attitudes in order to create a conscientious Zimbabwean who understands the role of sustainable agriculture. Consumers of all ages must be assisted in their understanding of production economics so that they understand the mechanisms of agriculture, and especially price structures of agricultural commodities. The long-term goal is to produce a cadre of agricultural and extension education professionals who can train others. For example, approximately 1200 agricultural teachers must be trained for employment by both government and the private sector to meet current demand.

At the present time there are inadequate supplies of agricultural teachers in primary and secondary schools in Zimbabwe. To add to the problem, many who now teach agriculture courses lack proper agricultural education or communications training. Likewise, in extension, there is a severe shortage of qualified educators. A substantial pool of agricultural knowledge exists, but there is limited capability for dissemination and appropriate application. There is a need to combine extension education skills with technical knowledge in agriculture.

The study team recommended that agricultural education and extension be added as an additional field of specialization in the Faculty of Agriculture at the University of Zimbabwe. The option might evolve into a full BSc degree program at a later date, after sufficient enrollment and resources have been attained. Students completing the proposed agricultural education and extension option should fulfill three primary objectives. They will:

- be equipped to teach agricultural sciences at primary, secondary, and tertiary levels of the formal educational system;
- understand, and be able to utilize, methods and techniques necessary to perform extension services; and
- possess analytical skills required to understand the social structure and change processes influencing agricultural development in Zimbabwe.

The recommended BSc option in AEE should be 3 years in duration and have entrance requirements equivalent to current BSc options. Those with good grades at the Diploma-level will also be considered for admission. Even though there is a need to use some facilities and resources in the Faculty of Education, the AEE program should be administered and implemented by the Faculty of Agriculture, initially housed in the existing Department of Agricultural Economics and Extension.

The structure should include approximately two-thirds core general agricultural courses and one-third AEE courses. The content should include education (foundations, methods, management, administration, and program planning) and agriculture (selected courses from the major agricultural disciplines). Students should take core courses for the BSc Agriculture degree and specialize in AEE. They should be required to complete an internship in both education and extension. Location of internships could be with schools, Agritex, parastatals, individual farmers, estates, nongovernmental organizations, or private businesses.

The curriculum must have a truly experiential, practical emphasis. Project work, field classes, and field trips should be conducted in both communal and commercial areas. Extensive use of case studies and role plays must undergird the teaching strategies. Ideally, the University of Zimbabwe should shift from its year-long course structure to a semester system. If there were any way for the university to facilitate this type of transformation, implementation of a flexible and more experiential AEE curriculum would be more likely. The proposed subject-matter of the BSc option in AEE includes the following elements:

Part I:

AEE	101	Introduction to AEE
AEE	102	Introduction to Rural Sociology
AGEC	101	Economics of Agriculture
AS	101	Animal Science
CR	101	Crop Science and Genetics
SL	101	Introduction to Soil Science
AGPR	101	Agricultural Practice

Part II:

AEE	201	Curriculum Development and Design in AEE
AEE	202	Educational Communication in AEE
AEE	203	Evaluation and Measurement in AEE
AEE	204	Teaching Practice

Plus three of the following courses:

AGEC	202	Farm Management
CR	203	Crop Production
CR	207	Introduction to Horticulture
AS	207	Principles of Livestock Production
SL	204	Land Use and Natural Resource Evaluation

Part III:

AEE	301	Principles and Practices of Environmental Education
AEE	302	Management and Administration of AEE
AEE	303	Research Methods of AEE

Plus three approved choices from the following courses:

AS	308	Range Management
AGEC	303	Natural Resource Economics
SL	310	Soil and Water Management
CR	303	Crop Production
CR	307	Fruit and Vegetable Production
SL	309	Agricultural Mechanization and Engineering
AEE	360	Research Project

The agricultural education and extension program must interact with departments in the Faculty of Agriculture in numerous manners. AEE staff should offer service courses, participate in team teaching, and cooperate in multi-disciplinary problem-solving research initiatives. They should also provide representation on Faculty committees, participate as external examiners, conduct joint university outreach programs, and contribute to information exchange. AEE staff have the opportunity to cooperate with other staff in the Faculty of Agriculture in making the university more open to the community.

There must be linkage between all segments of the AEE system in Zimbabwe

People in Zimbabwe should have agricultural and extension education opportunities in primary schools, secondary schools, institutes, colleges, extension organizations, and in the private sector. To accomplish this ideal, Zimbabwe must streamline its fragmented agricultural education and extension system. A formalized linkage committee, board, or council should be formed to include representatives from the Faculty of Agriculture, Faculty of Education, Ministry of Lands, Ministry of Higher Education, Ministry of Education, commercial farmers, parastatals, nongovernmentals, private organizations, etc. It is especially important that future employers, both public and private, review all outcomes of the consultative process that such a group might initiate. Through this and other mechanisms, coordination, and consultation would be encouraged with and between all interested parties.

Furthermore, there is need to coordinate all agricultural and extension education programs where formal certificates are issued to recipients/trainees upon completion of courses. This is necessary in order to:

- satisfy the needs of employers, trainees, and the nation,
- avoid duplication of services,
- curtail dubious or clandestine institutions from springing up,
- rationalize the use of available resources,
- set/maintain standards in the areas of content, methods, duration, and level of training, and
- create realistic relationships with other structures (such as credit institutions).

Students should be allowed to proceed in either professional or academic paths without hindrances. For example, students who have completed agricultural certificates or diplomas, if qualified, should be allowed to proceed on to the diploma or degree level. Those who do not proceed to degree programs should be absorbed into the agricultural economy.

The new AEE program should have a strong community service orientation

The university has not been keen to address the practical problems that affect rural communities. There has been a tendency to offer degrees that respond to the needs of the intellectual milieu without necessarily addressing the needs of rural communities. There is a need for the university to switch from this stance to programs that respond to the needs of society, not just the academic community.

The university should expand its public service outreach to include in-service training to government and non-government staff. Postgraduate and short-courses could be offered to agriculture teachers, extension staff, and others as an outgrowth of Program expansion. There may also be a market for training people from other countries as an income generating activity.

The new AEE program should have an applied and coordinated research focus.

The present state of affairs regarding agricultural research in Zimbabwe is not satisfactory. There are many organizations conducting research (national research programs, university, local and foreign nongovernmental organizations, and the private sector). Most of these programs are separate and uncoordinated, not adequately addressing the problems of society. This is an unwise investment of resources. At present, coordination is done on an informal basis. It is recommended that formal linkages be instituted by the following organizations: various ministries and agencies (especially the Department of Research and Specialist Services), universities, nongovernmental organization, parastatals, and the private sector. The cooperation currently being exercised between the Faculty of Medicine and the Ministry of Health should be observed as a model of effective collaboration of an applied research program.

Research conducted in agricultural education should involve examination of education, both formal and nonformal at the primary schools, secondary schools, institutes, colleges, and the universities. Agricultural extension research should involve all people who are working on nonformal education programs with farmers and community members in Zimbabwe. Special efforts must be made to coordinate extension research efforts with Ministry of Lands, Agriculture, and Rural Resettlement program outreaches.

Educational Importance

Prior to the undertaking of the study that led to the preparation of this paper, the concept of agricultural and extension education as an area of academic study was virtually unknown in Zimbabwe. The educational system had programs for training technical experts in the agricultural disciplines of crop science, animal science, agricultural economics, soil science, and agricultural engineering but no degree-level programs that concentrate on the education, communication, and sociological aspects of agricultural development. The study process not only documented the status of supply and demand for agricultural and extension educators in Zimbabwe, it served as a vehicle to raise awareness of a gap in the educational system. Lessons learned in Zimbabwe can be examined by those educators from other countries, especially those working in other African countries, trying to leverage change for the benefit of the rural people.

Postscript

As a result of the findings of the Zimbabwe AEE study, the University of Zimbabwe's Faculty of Agriculture approved start-up of a new BSc degree option in Agricultural Education and Extension. If sufficient resources can be harnessed, the new program will be launched and students enrolled for the 1994 academic year.

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PERCEIVED PROFESSIONAL COMPETENCIES NEEDED BY EXTENSION SPECIALISTS AND AGENTS IN KHORASAN STATE OF ISLAMIC REPUBLIC OF IRAN

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Introduction

The formal agricultural extension service in Iran came into being in 1953, and since its inception has been affected by changes in government and agricultural policies (Salmanzadeh, 1988). In 1964 the White Revolution introduced by the then Shah of Iran had a generally negative impact on extension and agriculture. Subsequently the extension agents generally came to be perceived as less effective and demoralized, and farmers were less accepting of ideas from extension personnel (Malak-Mohammady, 1988). This ultimately was viewed as inhibiting the capacity of farmers to produce sufficient food for the country. Malak-Mohammady (1988) noted that Iran began to import food subsequent to the implementation of the White Revolution. Until 1964, Iran was self-sufficient in food production. The decline in the perceived effectiveness of the extension service in Iran continued during the Islamic Revolution. Salmanzadeh (1988) noted that the revolutionary authorities upon coming to power in 1979 stressed they were committed to achieving self-sufficiency in agriculture through the development of peasant agriculture. Extension in Iran has been identified in the current five-year development plans as a critical element for attaining agriculture self-sufficency.

Waldman and Spangler (1989) indicated that part of an organization's effectiveness is influenced by the job knowledge and skills possed by organizational employees. Extension agents and specialists need skill and competence to design, implement and evaluate educational programs for farmers. Lack of proper balance between technical and professional competencies in staff has been identified as a common problem in the extension services of developing countries (Bradfield, 1966; Maunder, 1972; Easter, 1985). According to Easter , one of the weaknesses in past approaches in preparing extension personnel in developing countries has been the inability to focus on the professional competencies. A number of studies have identified professional competencies needed by extension personnel in various countries (Randavay, & Vaughn 1991; Najjingo-Kasujja, & McCaslin, 1991; Easter, 1985; Ongondo, 1984; Ayewoh, 1983; Umuhak, 1980; Gonzalez, 1982; Al-Zaidi, 1979; Karami, 1979; Boonruang, 1973; Smitananda, 1958; Sabihi, 1978). The findings from these studies indicate that extension agents in developing countries should possess professional competence in the areas of administration, program planning and execution, evaluation, communications, teaching and extension methods and understanding human behavior.

When the professional competencies should be learned by extension agents has been examined by several researchers. Gonzalez (1982) identified 144 competencies needed by extension agents in Pennsylvania. Of the 144 competencies, 26 were identified as needing to be learned before entering the job, six during a graduate program and the remaining 113 through inservice education. Similar findings were reported by Ayewoh (1983) for extension agents in Nigeria. Conversely Ongodo (1984) found that for a majority of the extension agents in Kenya the competencies were to be learned before entering the job.

Other researchers have examined differences or relationships between demographic characteristics of extension personnel and the perceived level of competency needed by extension agents. Findings from these studies indicate that variables such as age (Gonzalez, 1982 and Sabihi, 1978), educational level (Najjingo-Kasujja and McCaslin, 1991) and work experience are related to the importance of specific professional competencies needed by extension agents. However, Easter (1985) found no significant differences between the perceived level of professional competency needed and demographic characteristics such as age, gender, educational level, position, area of responsibility and experience for Swaziland extension agents

Sabihi (1978) examined the professional educational training needs of extension specialists and agents in selected provinces (states) of Iran, and recommended that further research should be conducted in other states of Iran. Thus, this study examined the professional competencies needed by extension agents and specialists in Khorasan State of the Islamic Republic of Iran (IRI).

Purpose and Objectives of the Study

The primary purpose of the study was to identify the professional competencies needed by extension specialists and extension agents in Khorasan State, IRI. A second purpose was to determine whether extension personnel perceived the competencies should be learned during preservice or inservice education. Objectives of the study were:

1. To identify the professional competencies needed by extension specialists and agents and identify differences in competencies needed by extension agents and extension specialists in Khorasan State of IRI.

2. To determine when the professional competencies should be learned as perceived by extension agents and specialists.

3. To determine relationships between selected demographic characteristics and the value of competencies needed by extension agents and specialists.

For the purpose of this paper, results are not presented for the third objective.

Methods and Procedures

The study utilized descriptive survey research. The population for this study consisted of all 68 extension specialists and the 218 extension agents employed in Khorasan State of IRI. The population frame was obtained from State's Department of Agriculture, Khorasan State, IRI.

The researchers developed the survey instrument by adapting components from the instruments developed by Gonzalez (1982), Easter (1985), Ongondo (1984), and Ayewoh (1983). Face and content validity of the instrument was established using a panel of experts consisting of senior faculty members in agricultural and extension education. Subsequently the instrument was translated into Farsi. The Farsi version of the instrument was reviewed for content validity by personnel in the ministry of agriculture and the department of agriculture, Khorasan State of IRI. The revised Farsi version of the instrument was field tested with 10 extension specialists and agents in Mazandaran, a neighboring State in IRI.

After incorporating their suggestions, the final version of the instrument was printed in booklet format and contained two major sections. Section one contained 125 competencies grouped within 8 competency categories (administration, program planning, program

execution, teaching, communication, understanding human behavior, maintaining professionalism and evaluation). Items in this section were rated in terms of being needed by extension personnel using a scale that ranged from 1=no value - does not apply, 2=low value, 3=moderate value, 4=high value, 5=very high value. In addition, perceptions when these competencies should be learned (preservice or inservice) were also examined. Section two of the survey elicited demographic information from specialists and agents (native, dialect, age, marital status, gender, position title, subject matter specialty, administration and teaching responsibilities, years experience in extension and in the current position, highest education level, number of personnel supervised, and place of residence).

Data for this study were collected through a mail survey. A total of 227 responses were usable (79%). According to the procedures suggested by Miller and Smith (1983), early and late respondents were compared on key study variables. No practical differences existed between early and late respondents on the key variables examined.These variables included the demographic variables and the overall mean competency statement values in each of the eight competency categories. Thus, the findings of the study were generalized to the entire population. A reliability analysis, conducted using the final study returns for the 227 respondents, indicated that the instrument had acceptable reliability. Cronbach's alpha values ranged from .82 (evaluation) to .93 (administration).

Results

Professional Competencies Needed

The perceived professional competencies needed, based on perceived value, by extension agents are presented in Table 1. Only the top three competencies in each of the eight competency areas are reported in this paper. The top three competencies were identified based on their respective mean value. Managing time effectively (4.44) was the highest rated competency in the administration category. Determine needs of clients for extension programs (4.39) was rated highest in program planning category. Develop a working relationship with clientele (4.41) was rated highest in the program execution category. Present information with televised and video-taped materials (4.46) was the top-rated competency in the area of teaching. Establish communication among extension staff (4.21) was rated highest in the communication category. Identify pressure groups within the community (4.36) was rated highest in the understanding human behavior category. Identity opportunities for professional improvement (4.36) was the top rated competency in maintaining professionalism. Use the experimental approach in extension work (4.48) was rated highest in the evaluation category.

The professional competencies needed, based on perceived value, as reported by specialists are presented in Table 2. Only the top three competencies in each of the eight competency areas are reported. Write realistic goals for the extension programs (4.54) was the highest rated competency in administration. Determine needs of clients for extension programs (4.42) was rated highest in the program planning category. Use a variety of techniques to influence people to change (4.40) was rated highest in the program execution category. Present information with televised and video-taped materials (4.57) was the top rated competency in the area of teaching. Prepare extension publications (4.31) was rated highest in the communication category. Recognize traditional culture and its effect on change(4.43) was rated highest in understanding human behavior category. Identity opportunities for professional improvement (4.38) was the top rated competency in maintaining professionalism. Use the experimental approach in extension work (4.66) was rated highest in the evaluation category.

Differences Between Agents and Specialists

The perceived differences between agents and specialists relative to the perceived value of professional competencies are shown in Table 3. Since this study involved a census, inferential statistics were not used. To determine if differences existed the investigators established a difference in means of .2 or higher as indicating a difference in perceptions of agents and specialists. The greatest number of competency statements for which the difference criterion was met existed in the evaluation competency area.

Table 1: Means and Standard Deviations for the Top Three Professional Competencies Needed by Extension Agents Within Each Competency Category.

Competency Category and Competency Statement	N	Mean	SD
Administration			
1) Manage time effectively	153	4.44	.77
2) Develop the leadership potential of staff	153	4.39	.82
3) Write realistic goals for the extension program	155	4.38	.73
Program Planning			
1) Determine needs of clientele for extension programs	155	4.39	.68
2) Determine objectives/goals of the extension programs	155	4.19	.80
3) Develop a calender of extension activities	154	4.19	.80
Program Execution			
1) Develop a working relationship with clientele	155	4.41	.72
2) Use a variety of techniques to influence people to change	155	4.34	.85
3) Conduct farm visits	155	4.33	.73
Teaching			
1) Present information with televised and video-taped materials	155	4.46	.82
2) Plan, organize, and conduct tours and field trips	155	4.43	.73
3) Present information with sound motion pictures	155	4.34	.82
Communication			
1) Establish communication among extension staff	154	4.21	.68
2) Use a camera and/or other photographic equipment	154	4.19	.82
3) Prepare extension publication	155	4.13	.87
Understanding Human Behavior			
1) Identify pressure groups within the community	154	4.26	.93
2) Recognize traditional culture and its effect on change	155	4.14	.88
3) Recognize learning differences in age groups	154	4.05	.85
Maintaining Professionalism			
1) Identify opportunities for professional improvement	154	4.36	.74
2) Develop a plan for professional development	155	4.23	.78
3) Establish and maintain a professional philosophy	154	3.97	.89
Evaluation			
1) Use the experimental approach in extension work	155	4.48	.81
2) Cooperate with research stations	155	4.47	.78
3) Interpret research findings from research stations	154	4.40	.90

Mean computed on a scale 1="no value-does not apply" to 5="very high value"

Learning of Competencies

Data regarding when the professional competencies should be learned as perceived by agents and specialists are presented in Table 4. Overall the trend is that both agents and specialists reported more frequently that the professional competencies should be developed at the inservice level rather than at the preservice level. There were four competencies in the administration competency area identified as needing to be developed at the preservice level.

Table 2: Means and Standard Deviations for the Top Three Professional Competencies Needed by Extension Specialists Within Each Competency Category.

Competency Category and Competency Statement	N	Mean	SD
Administration			
1) Write realistic goals for the extension program	68	4.54	.63
2) Manage time effectively	68	4.51	.74
3) Orient new staff members	68	4.47	.66
Program Planning			
1) Determine needs of clientele for extension programs	67	4.42	.66
2) Determine objectives/goals of the extension programs	68	4.41	.63
3) Develop a calender of extension activities	68	4.29	.67
Program Execution			
1) Use a variety of techniques to influence people to change	67	4.40	.70
2) Conduct farm visits	68	4.37	.73
3) Provide leadership for program planning and execution	68	4.34	.64
Teaching			
1) Present information with televised and video-taped materials	68	4.57	.56
2) Present information with sound motion pictures	68	4.51	.59
3) Identify and use principles and procedures in teaching adults	68	4.49	.68
Communication			
1) Prepare extension publication	68	4.31	.74
2) Use a camera and/or other photographic equipment	68	4.15	.68
3) Establish communication among extension staff	68	4.09	.92
Understanding Human Behavior			
1) Recognize traditional culture and its effect on change	68	4.43	.76
2) Identify pressure groups within the community	68	4.22	.94
3) Identify factors influencing people to become involved	68	4.22	.62
Maintaining Professionalism			
1) Identify opportunities for professional improvement	68	4.38	.75
2) Develop a plan for professional development	68	4.29	.79
3) Establish and maintain a professional philosophy	68	3.97	.77
Evaluation			
1) Use the experimental approach in extension work	68	4.66	.53
2) Identifying problems requiring additional research	68	4.59	.58
3) Apply research findings	68	4.54	.68

Mean computed on a scale 1="no value-does not apply" to 5="very high value"

Table 3: Means and Standard Deviations for Perceived Level of Professinal Competence Needed by Extension Agents (155) and Specialists (68)

Competency Category and Competency Statement	Agents		Specialists	
	Mean[b]	SD	Mean[b]	SD
Administration				
1) Explain terms of service	3.97	.99	3.64	1.01
2) Coordinate work schedules of staff	3.90	.86	4.25	.79
3) Resolve conflicts	3.77	1.05	3.36	1.05
Program Planning				
1) Determine objectives/goals of the extension program	4.19	.80	4.41	.63
2) Prepare an annual program of work	3.95	.94	4.27	.71
3) Prepare a long-range program of work	3.76	.90	4.12	.83
Program Execution				
1) Provide leadership for program planning and execution	4.04	.94	4.34	.64
2) Arrange for transport of extension personnel and clientele	4.09	.85	3.81	.92
Teaching				
1) Identify & use principles & procedures in teaching adults and youth	4.25	.94	4.49	.68
2) Use principles of learning and teaching	4.12	.96	4.46	.61
3) Present information in a lecture	4.05	.78	3.81	.89
4) Develop teaching materials	3.94	.83	4.24	.74
Communication				
1) Prepare research journal articles	3.79	.87	4.04	.86
2) Deal with complaints	3.83	1.04	3.46	1.04
Understanding Human Behavior				
1) Recognize traditional culture and its effect on change	4.14	.88	4.43	.76
2) Identify factors influencing people to become involved	4.03	.73	4.22	.62
3) Apply principles of motivation	3.87	.88	4.22	.71
Evaluation				
1) Identify problems requiring additional research	4.36	.82	4.59	.58
2) Evaluate the effectiveness of extension programs	4.12	.80	4.47	.66
3) Evaluate the performance of extension staff	4.23	.88	4.46	.78
4) Keep up-to-date with current research findings	4.07	.85	4.39	.72
5) Interpret results of questionnaires	3.85	.91	4.16	.92
6) Analyze reports	3.86	.98	4.16	.75

a Only competencies with significant differences between the means >.2 are reported.
b Mean computed on a scale 1="no value-does not apply" to 5="very high value"

Table 4: Distribution of Respondent's Choice of Time for Learning Competencies in the Competency Categories. (N=227)

Competency Category	Number of competencies		Total Items per Category
	Preservice	Inservice	
Administration	4	21	25
Program Planning	0	10	10
Program Execution	0	13	13
Teaching	0	23	23
Communication	0	22	22
Understanding Human Behavior	0	12	12
Maintaining Professionalism	0	4	4
Evaluation	0	16	16
Total	4	121	125

Educational Implications

There appear to be two general areas in which the results have educational implications for extension personnel. Both of these areas are relevant to the renewed emphasis being given to extension in Iran's renewed commitment to self sufficiency. As Iran expands the number of personnel in extension in Iran, there will initially be more people entering the extension system who do not have previous extension experience or preparation. Thus the two areas of educational implications relate first to the development of preservice programs to prepare extension personnel and second to continuing education programs for employed extension personnel.

In Iran there are currently underway efforts to develop preservice programs which would provide opportunities for persons to complete a professional extension education program prior to entering the extension system. The current five-year development plan calls for new hires to initially have the equivalent of an associate degree and ultimately new hires to hold a bachelor's degree prior to employment as an extension agent. The results of the current study suggest that current extension personnel do not perceive the need for many professional extension competencies to be learned at the preservice level. The investigators suggest current employees report perceptions based upon what they experienced. It is recommended that a core of credible extension personnel serve in an advisory capacity to university personnel responsible for developing preservice extension programs to identify the most appropriate competencies to be used as the critical core in designing preservice programs. We believe such an approach will help lend credibility to the emerging preservice programs and provide an avenue for continuing assessment regarding the implementation of the preservice program.

The study results suggest that almost all the professional competencies should be learned after the agents are employed. This suggests that even after preservice programs are implemented there remains a substantial need for continuing education programs for extension personnel. This will require an articulated continuing education program which addresses the specific professional needs of agents.

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THE NEED FOR A NEW APPROACH TO AGRICULTURAL HIGHER EDUCATION IN LATIN AMERICA

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Introduction

Higher education in agriculture throughout much of Latin America today, with it's limited focus on production agriculture and emphasis on the reductionist paradigm in education, is not up to the task of preparing professionals capable of successfully confronting the challenges of today's world. Graduates are particularly unprepared for effectively addressing the needs of rural populations and the complexities inherent in producing food and fiber while conserving the natural resources of the region's humid tropics.

This paper suggest that a new paradigm is needed in agricultural higher education. Such an approach must retain the development of a solid base in technical and scientific principles, yet add an emphasis on problem solving through experiential learning, curricular integration, ethics and participative inquiry. The Escuela de Agricultura de la Región Tropical Húmeda (in English: The Agricultural College of the Humid Tropical Region, also known by its Spanish acronym EARTH) in Costa Rica is an institution attempting to implement such an approach.

Purpose of the Paper

The purpose of this paper is to draw attention to the magnitude of the human and ecological problems confronting the humid tropics. The paper suggests that the traditional approach to higher education in agriculture and natural resource management, with its emphasis on high input based production, disciplinary research and teacher centered education, is incapable of preparing young people to meet these challenges. The EARTH College is introduced, and aspects of its philosophy and practice which make it noteworthy are discussed. The paper is written as a contribution to the on-going dialogue on the role of higher education in agriculture, especially with respect to the imperatives of environmental conservation and agricultural sustainability.

Why a College for the Humid Tropics?

The importance of the humid tropical ecosystem lies in its incredible biodiversity; home to anywhere between 50-90% of the world's species of plants and animals, it represents only perhaps 7% of the planet's landmass (Lovejoy,1986, Newman, 1990). The diversity of life in the rainforest is best illustrated by comparison to other ecosystems. While a hectare of relatively diverse temperate forest may be home to 20 tree species, in the same area in a rainforest one might find upwards of 200 species (Newman, 1990). In Costa Rica, a small tropical country roughly the size of West Virginia, more species of birds have been observed than in all of North America north of the Mexican border (Stiles & Skutch, 1989).

Yet the humid tropics, in Latin America as well as in Asia and Africa, are in serious danger. As many tropical species are highly specialized, they are particularly vulnerable to habitat loss. The habitat of Costa Rica's golden toad for example, is a single mountaintop; its habitat could be destroyed in less than a day with modern logging techniques. Attempting to document the extent of deforestation resulting from logging, ranching, plantation agriculture and unrestricted land clearing by small farmers, is notoriously difficult (Whitmore & Sayer, 1992;), nevertheless, many authorities estimate that worldwide in the neighborhood of 28 million acres of tropical forest are destroyed annually (Postel, 1988; Caufield, 1985). FAO has estimated that Costa Rica is losing 4% of its existing forest cover every year (Whitmore & Sayer 1992).

The genetic resources of the humid tropical rainforest can make significant contributions to advances in crop production, development of pharmaceuticals, pesticides and numerous other areas. Still, in spite of all the advances in scientific understanding, "...our knowledge of biological systems is so superficial that there is not a single species for which it can be said that we know it in its entirety and need not retain it for its potential contribution to biological knowledge." (Lovejoy, 1986 page 17). A very strong argument can also be made that non-human species have an intrinsic value, regardless of the potential benefits to mankind, and that we consequently all share an ethical responsibility for conserving biodiversity.

Many inhabitants of the humid tropics are recent settlers who, as a result of population pressures and/or the concentration of traditionally productive land in relatively few hands, have colonized the rainforest in an effort to feed their families (Caufield, 1985; Denslow & Padoch, 1988). These settlers, by clearing ever larger extensions of the tropical forest and utilizing agricultural technologies developed under very different ecological conditions, contribute significantly to the environmental degradation of the lowland tropics. The loss of forest cover, and the consequent decline in soil fertility, necessitates the clearing of ever larger areas of forest and further cements the link between poverty and environmental degradation.

As if these environmental and technological constraints were not sufficient, the distance of the humid tropical regions from major urban centers and difficult terrain result in a lack of infrastructure development necessary for agricultural and economic development (Caufield, 1985). In addition, because the population of the humid tropics is frequently of a different race or ethnic grouping than the dominant group in the nation (Denslow & Padoch, 1988), these areas all too often suffer from the effects of government neglect with respect to health care, education and other social services, relegating the inhabitants to a seemingly endless cycle of powerlessness and poverty.

The Need For A New Model

As agricultural production and natural resource exploitation represent both the economic base and the primary cause of environmental degradation in the humid tropics, the development of skilled professionals capable of initiating and managing change in current practices is imperative. The traditional approach to education in agriculture in Latin America has been successful in producing researchers and public sector functionaries who have made substantial contributions to advances in agriculture. In the areas of crop improvement, improved animal agriculture, credit and marketing infrastructure and extension education, great strides have been made. This approach to education in agriculture is characterized by an emphasis on production agriculture, a reductionist approach to science, teacher-centered learning and far too much memorization of theories and far too little opportunity for practice.

Finding solutions to the socioeconomic problems of the population of the humid tropics and halting the escalating environmental destruction in the region requires a shift away from production and commodity agriculture towards sustainable and productive rural development. Higher education in agriculture must effectively address the agricultural system in all its complexity, including the integration of production with the multiple other activities of the farm household, micro and macro-economic concerns, environmental imperatives and ethical considerations - in short, education must begin to focus on agriculture as a system and a human activity, as opposed to simply commodity production (Bawden, et al 1984).

Such a shift implies that thinking must focus on wholes rather than exclusively on parts, and an appreciation that the whole is often greater than the sum of the parts. In addition, "knowledge about how the parts fit together is...just as important as knowledge about the parts themselves." (Bawden & Busch, 1988).

Because the inhabitants of the humid tropics are all too frequently the last ones to have a voice in the decisions that impact their lives, it is critical that professionals in agriculture be exposed to community development and social action strategies. As agents of change in the humid tropics, university graduates should be capable of assuming leadership roles, as well as be skilled in eliciting the participation of everyone in the agricultural and social systems in which they are involved. Developing these abilities requires an emphasis on communication skills in formal curricula, as well as providing a university environment that promotes participation by all members and the development of collegial relations between faculty, staff, community members and students.

Finally, despite their successes, institutions of higher education in Latin America, with a couple of notable exceptions, have done a very poor job of providing students practical skills and self-confidence in their ability to perform in the field. Teaching is too often confined to the classroom, and it is a common perception among graduates (as well as faculty and employers) that students are provided far too few opportunities for

practical application (see for example Anderson, 1983). As a result, many employers are quite critical of the abilities of entry level employees to effectively manage production at the farm level. While it is undeniably true that the limited opportunities for field based practice is partly a result of a lack of resources, it also reflects a commonly held attitude that professionals work in laboratories and offices, wear ties and don't get their hands dirty. This attitude only encourages graduates to seek positions in the capital and provincial cities and deprives rural areas of the professionals they so desperately need.

The Escuela de Agricultura de la Región Tropical Húmeda

The four-year, baccalaureate degree education offered at EARTH represents a significant departure from the dominant approach to agricultural higher education in Central America and elsewhere. The mission of the University, which was established in 1990, is to to prepare young people who are capable of sustainably managing the agriculture and natural resources of Latin America's humid tropical regions. The school is located in the Atlantic lowlands of Costa Rica in the heart of a banana growing region. The 8,000 acre school farm includes 1,000 acres of bananas in commercial production, a variety of other traditional and non-traditional tropical crops, commercial beef cattle production and a 400 acre forest reserve which is presently being expanded.

Now in its fourth academic year, the University has a student body of approximately 350, representing fifteen Latin American countries. The majority of the students are from humid tropical regions within their countries, and all but a handful receive full or partial scholarships provided by the University, governments, private companies and foundations. Requirements for admission include successful completion of secondary school, demonstrated leadership capabilities, interest in agriculture and commitment to participating in the development of the humid tropics. As a result of a carefully designed selection process with a high degree of faculty involvement, student retention has been extremely high.

The faculty and administrative staff is equally diverse, with representation from South, Central and North America, the Caribbean, Africa and Asia. Criteria used in the selection process include academic excellence, a desire to teach, work and learn alongside students, farmers and other rural dwellers in the classroom and field, knowledge and experience in the humid tropics and a commitment to sustainable rural development.

The approach to learning at EARTH is a radical departure for students accustomed to equating learning exclusively with the acquisition of information. For students conditioned to rote "learning", the emphasis on systems, complexity and problem solving is unsettling. EARTH's academic program conceptualizes agriculture as a human endeavor, and encourages students to think about agriculture and natural resource management within their social and economic contexts, as well as in

technical/scientific terms. Multi-disciplinary and team teaching approaches are used extensively, and case studies and other small group activities provide opportunities for students to think critically and experiment with problem solving. While a key goal of the academic program is to have students begin thinking about learning in unfamiliar ways, to develop as independent learners, the overall focus of the program is on improving the situation of the humid tropics - on "transforming experience into knowledge for action" (Kolb, 1984). Learning is viewed as a process of making sense out of day-to-day experiences as a means of affecting the situation.

Beginning courses such as *Food, Agriculture and Natural Resource Management* provide first year students with an overview of the "situation" of agriculture and natural resource management. While the emphasis in subsequent years may indeed shift towards more narrowly focused areas, for example soils, statistics or food processing, constant efforts are made to integrate class activities across disciplines. A professor of soils and an animal science instructor for example, may coordinate their courses to focus on the biology, chemistry and management of pasture soils.

Extensive opportunities for applying theoretical principles in the field are provided. Student enterprise projects, the work experience program, and a four month professional internship, all build student's self confidence and provide a chance to work together to solve specific problems and most importantly, learn the process of how to go about solving problems.

The focus on problem solving and conceptualizing agriculture as a system does not negate the importance of becoming familiar with basic principles and concepts. In fact, students are expected to acquire a good deal of technical knowledge. Nevertheless, the philosophy of EARTH is that principles and basic concepts must be presented within a contextual framework and that students be provided opportunities for applying such information.

Student Enterprise Projects provide just such an opportunity. Beginning during their first trimester at EARTH, small groups of students representing different nationalities form enterprises. Each enterprise must, through a group decision making process, select a crop they wish to raise. The group must then conduct a detailed feasibility study analyzing technical, economic and environmental criteria, and present the results to a panel composed of a faculty member, a student, and a local farmer with first hand knowledge of their enterprise choice. If approved, the university lends the group, with interest, the capital necessary to finance their project. The students are then completely responsible for their project, including labor, budgeting, marketing and all management decision making. After harvest and sale to local markets or export brokers, the net return is divided between the students, with the university reserving a small percentage to finance projects which fail to provide a return. Examples of projects include the production and export of ginger root, cassava, and yams, production of banana plants for transplanting, of forestry tree seedlings for sale to local farmers, propagation of ornamental plants for export, and pineapple production.

The production of bananas at EARTH provides an illustration of the University's approach to integrating ethical concerns into the learning process, as well as the focus on problem solving and situation improvement. While representing an important source of foreign exchange and jobs for countries such as Costa Rica (as well as income for the University), the widespread production of bananas presents serious environmental consequences. The clearing of rainforests to plant bananas, the misuse and overuse of pesticides, particularly nematicides, and waste disposal are the most serious problems. The University's commercial banana enterprise thus becomes a laboratory for actively seeking solutions to these problems. In the classroom, students and faculty analyze and debate the costs and benefits of banana production, while in the field students have the opportunity to participate in concrete efforts to ameliorate the harmful effects of banana cultivation. They may join in efforts to monitor the effects of pesticides on the floral and fauna and human inhabitants of the region, and participate in more effectively scheduling pesticide applications to both reduce quantities applied and number of applications. Students concerned with the contamination of aquatic resources have cleaned up plastic wastes in local rivers and participated in a pilot program to recycle such wastes into flower pots and plastic fence posts. Students are also provided opportunities to become involved in another pilot program in which organic banana wastes are recycled into paper and compost. Finally, through active involvement in efforts to bring together environmentalists and banana producers in defining common ground, the University is providing students a model for problem solving in the complex world of modern agriculture.

Through their participation in activities such as banana production, students have the opportunity to gain many of the skills they need to become effective "situation improvers" in the humid tropics. Most importantly, their involvement in analyzing the situation and actively participating in implementing solutions is a powerful process of empowerment, which in turn is a critical factor in preparing responsible citizens and agents of change (Hungerford & Volk, 1990). While many of them will return after four years to regions with very different problems than those of Costa Rica's humid tropics, the process of problem solving they have learned will allow them to be effective agents of change.

Conclusion

Serious environmental and social challenges confront the humid tropical region. Deforestation, loss of biodiversity and marginalization of the population are problems that desperately require solutions. There is a critical need for professionals capable of acting as effective change agents in the region, reconciling the need for economic development while protecting and conserving ecological balance. The traditional approach to higher education in agriculture has been unsuccessful in preparing such a professional. The Escuela de Agricultura de la Region Tropical Humeda, EARTH, represents a new paradigm in agricultural education. This new agricultural University

is attempting to substitute the reductionist, discipline-based and faculty-centered instructional program with a student-centered learning system, emphasizing cross disciplinary integration, ethical concerns, extensive opportunities for learning by doing and a focus on situation improvement. It is the belief of those involved in EARTH that this approach represents the best means of preparing professionals in agriculture for the challenges of the twenty-first century.

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Session B

AGRARIAN POLICY INFLUENCES

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Influence of Mexican Agrarian Policy on Rural Outmigration

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Introduction

For more than 150 years, two very different countries have shared a common border of more than 2,000 miles. To the north, the United States emerged as a highly industrialized, technically advanced Anglo-Saxon society. Mexico, to the south, with its strong Latin traditions produced a different society in which political independence has not meant economic independence. Large estates, known as haciendas and developed by invaders, dominated the Mexican landscape from the 16th through the late 19th centuries. The haciendas exerted control over huge areas of land as well as the laborers who worked on them.

Dictator Porfirio Diaz (1876-1911) presided over a confident and orderly society. His administration was characterized by low international debt, an effective interest rate, and aggressive rail construction. A conservative coalition of aristocratic landowners, church leaders, and generals controlled the Mexican economy which was based on large estates, semi-feudal organizations, and a society divided by race, source of income, and land ownership. By the end of the 19th century, the stable political conditions resulting from the Porfirian dictatorship and the national expansion policy allowed the haciendas to prosper. Unemployment was low and wages were adequate. Between 1880 and 1910 the population grew from 9.4 to 15.2 million. But, only 1.0 percent of the population controlled 97.0 percent of the land. In contrast, 97.0 percent of the rural population had only 2.0 percent of the land (Pare, 1989). In 1910, unrest and hunger for land led to an uprising of the peasant class fueled by intense resentment of the landed class.

The major governmental reform to result from the Revolution of 1910 was a new constitution containing specific principles interpreted by the peasants as guarantee of basic rights of land, liberty and justice. However, the post-revolutionary government had the power to define and transmit property rights; villages had to petition the state for land. The state used control over land to expand its own power and base of support.

The ejido, communal property worked individually or collectively, was the basic element of restructuring. The ejido was a form of land tenure in which rights to national property were granted to groups that solicited national land. Villages would hold land in common, with ownership rights devolving around the population center. The ejido could be formed when a population center of at least 20 family heads was given property taken from surrounding private lands.

Local credit cooperatives were formed to provide funds to the ejidos and private, small farm owners. However, the intents of the law were subverted because a large portion of the agricultural sector was not served. The legal structure of the ejido tenure system and underdevelopment of the market mechanism weakened the credit worthiness of the ejidos. Reduced prices resulted from transportation problems and interference from "middlemen." The group responsibility for individual loans encouraged many to default, exacerbating the credit problem (Cole & Sanders, 1970).

In the 1930s, President Lazaro Cardenas envisioned rural development as genuine land reform and expanding rural infrastructure. The goals of his administration were to nurture a strong, land-holding peasantry and to eliminate the enemy from the Revolution--the hacienda class. Cardenas, a former revolutionary general, received support from mobilized workers and peasants in order to enact major land reforms and nationalize foreign oil companies. In the six years of his administration (1934-40), over 18.0 million hectares were distributed to 776,000 peasants, almost the same as during the period 1921-1934.

By 1940, 50 percent of the arable land in Mexico was in ejidos. The result of this was the change from pre-revolutionary efficient, surplus-producing agricultural units to small, inefficient

plots. A political shift to the right, supported by the US, came about as a reaction of the conservative rural bourgeoisie to the expanding ejidos. Counter reforms enacted by the state led to reconcentration of land to the wealthy. During this post-Cardenas period, the state used allocations of land, credit, and social services as a mechanism to maintain the clientelist and paternalistic relations with the peasantry (Cole et al., 1970).

The United States and Mexico embarked on a joint effort of technological exchange in 1943. The Mexican government was to provide the infra-structure--irrigation projects, transportation improvements, and capital--while the United States provided technical assistance and funds. During the period 1940-1960, many improvements were made within the agricultural sector. The amount of irrigated lands doubled, farm management practices improved, educational levels increased, mechanization increased, and high yield, disease resistant seeds were developed. By 1965, productivity was transformed by changes associated with the Green Revolution (Cross, 1981). Even with new advances, the implementation of agrarian policy during this period exacerbated previous problems and caused new ones in rural Mexico, primarily due to an unequal distribution of resources. This occurred for several important reasons. Policies favored certain crops over others, i.e., wheat over maize mainly because the US-developed technical package needed flat, irrigated land, most suited to wheat. Also, wheat farmers were better educated and had larger land holdings than ejidos; the ejido land was not adapted to wheat.

The North Center region of Mexico consists of six states: Durango, Guanajuato, Jalisco, Michoacan, San Luis Potosi, and Zacatecas. A rural area, it was dominated by haciendas which supplied livestock and other commodities to flourishing mines and young cities. The North Center can be used to study rural outmigration because of its role in the historical creation of the migration process and observed inadequacies of contemporary rural development in Mexico. Most of the haciendas were on semi-arid plateaus at an elevation of about 2,000 feet, and produced livestock, maize and dairy products. Haciendas located on fertile lowlands produced sugar and fruit. In the late 19th century, the North Center region had over one million inhabitants (about 1/10 of Mexico's total population). More than three-quarters of the population lived in areas of fewer than 1,500 persons, with an average of 200. Nearly all earned their living in the agriculture sector. More than 60 percent of the rural population lived on haciendas; many others were associated as laborers, sharecroppers, and renters. Unemployment was low due to the demand for labor in mining, transportation, and agriculture. But by 1910, there was a marked deterioration in rural life caused by a decline in real wages. Turmoil of the Revolution and destruction of the production system resulted in decreased employment opportunities. Migration became a way of life.

Purpose

The purpose of this study was to discuss Mexican agrarian policy relative to rural outmigration. An historical perspective of Mexican migration has been developed to aid understanding of the basis for migration and the resulting implications. This paper outlines policy and program implications for agricultural and extension educators who work in rural areas of Mexico or areas of destination for migrant workers.

Statement of the Objectives

Objectives of the study were:

1. To examine Mexican agrarian policies for the period 1910-1960.
2. To identify factors which contributed to increased rural outmigration.
3. To develop a policy and implications framework for agricultural and extension educators working with domestic or international Mexican origin workers.

Methodology

Analysis focused on the period 1910-1960, and three major social-political eras: (1) the Revolution and Rebellion of 1910-1929; (2) the Cardenas Era characterized by major land reform initiatives, 1930-40; and (3) the Green Revolution of 1943-1960, which saw major changes in government response to the agricultural sector. This study utilized data from *Socio-Economic, Political and Public Comparative Policy Data 1900-1960: Mexico (ICPSR 0034)* and relevant literature. Descriptive data analysis presents an overview and helps interpret changing population

and economic patterns during the time frame under investigation. Correlation analysis shows inter-relationships between selected measures of the Mexican agrarian policies and rural out-migration in the North Center. Because of the small number of cases (N=6), the selected correlations are only used to indicate trends. This limitation to the study results in the assumption of no statistically significant relationships. However, the correlation analysis can be utilized to identify a "common thread" between certain policy implementations and outcomes (Yoder, 1992).

Results and Discussion

The population of the North Center dropped dramatically during the years of the Revolution (1910-1917) (Table 1). Destruction of property and cropland in addition to increased military utilization of the transportation networks led to mass migration out of all six states. While the population increased in successive decades following the Revolution, it took until 1940 for levels to reach the pre-Revolution figures. The Green Revolution, with its accompanying input of technical and financial assistance from both the United States and Mexican governments, contributed to population stabilization during the period 1940-1960. However, the Green Revolution did little to halt the movement of braceros (legal immigrants contracted to the US) as a Mexican government solution to the loss of jobs created by ineffective land reform programs (Cross, 1981).

A trend in the residence patterns of North Center inhabitants is also evident in the data. In 1910, an average of 73.8 percent of the population lived in communities of less than 2,500 persons. By 1960 this percentage had declined to 59.7 percent. The population living in communities of 20,000-49,999 persons grew from an average of 4.1 percent in 1910 to an average of 6.9 percent in 1940 at which time it stabilized. In contrast, the population living in communities of greater than 50,000 persons increased steadily from an average of 8.6 percent in 1910 to an average of 18.4 percent in 1960 (Table 1).

Table 1. Total Population, % Change Over Decade, and Mean Population by Community Size.

	1910	1920	1930	1940	1950	1960
Total Pop.	813,367	692,333	789,117	895,800	1,108,333	1,412,933
% Change over Decade	(18.5)	(-18.0)	(17.3)	(14.9)	(25.7)	(27.7)
Mean % By Community Size:						
<2,500	73.8	72.9	70.9	70.1	65.7	59.7
20,000-49,999	4.1	8.7	0.0*	6.9	6.6	6.7
over 50,000	8.6	10.3	11.3	11.5	11.8	18.4

* Not Available

The percent of North Center residents that was economically active rose slightly between 1910 and 1920. Mass out-migration during this period of time probably consisted of persons not engaged economically resulting in a higher proportion of remaining residents having employment or being otherwise engaged. As the population began to climb, the proportion economically engaged dropped then began to stabilize. The percent of the population involved in non-ejido agricultural employment declined steadily between 1930 and 1960 (Table 2).

Table 2. Percent Economically Active: General and Agriculture Employment (non-ejido)

	1910	1920	1930	1940	1950	1960
Gen. Employment	32.8	34.6	31.1	29.9	31.1	30.7
Ag Employment	0.0*	0.0*	75.6	73.1	69.2	68.2

* Not Available

Ejido formation after the Revolution proceeded at a slow pace until the Cardenas administration during which time land reform was established as a priority. Nearly 4.5 times as much land was distributed during the Cardenas era than the previous decade. This was accompanied by a corresponding jump in ejido employment from 16.6 percent of the total employment in 1930 to 42.9 percent in 1940 (Table 3). However, the percent of ejido employment declined as government policies favored the larger landowner, making less financial and other assistance available to the ejidatario.

Table 3. Mean Percent of Agriculturally Employed Classified as Ejidatarios.

	1910	1920	1930	1940	1950	1960
Mean	NA	NA	16.6	42.9	32.7	26.2

*Data not available.

Table 4 presents information about the average farm size in hectares during the period 1930-1960. Declines realized during the land reform movement of the period 1920-1940 ceased at the onset of the Green Revolution and continued out-migration from the rural communities. A related factor is the money available for irrigation projects during the Green Revolution. Most money was targeted for other areas of the country more amenable to wheat production for export. This kept the percent of cultivated land under irrigation low in the North Center. Fewer crops for market, a decline in the ability of the ejido and small private farmer to compete, and loss in employment opportunity for rural residents resulted.

Table 4. Farm Size in Hectares and Percent Land Irrigated.

	1910	1920	1930	1940	1950	1960
Mean Farm Size	NA*	NA	283	222	226	265
% Land Irrigated	NA	NA	12.6	15.5	11.3	12.8

* Data not available.

The rise in the value of agricultural products parallels other trends observed. Some substantial increase (93.3%) was evident for the period 1930-1940. One explanation for this is that, in general, policies during the Cardenas Era favored agricultural production albeit on the larger farms. The Green Revolution which provided technical assistance from the United States and financial support for the agricultural sector from the Mexican government yielded huge gains in product values. There was a 391.6 percent increase between 1940 and 1950; less but still substantial gains of 100.0 percent were realized from 1950 to 1960. Examining the impact of the Green Revolution policies on value of agricultural products reveals a total increase in value of products of 883.1 percent. These factors, as they influenced the economic viability of the North Center, contributed to the out-migration of the rural population to urban areas, other regions of Mexico, and the United States.

Poverty level steadily declined in all states between 1910 and 1960. However, the greatest percent decline was during the years of the Green Revolution at 20.7 percent.

Correlation Data Analysis. A model was developed for the analysis that considered two groups of predictor variables and one group of outcome variables. Correlation analysis included evaluation of variables for each decade as well as relationships which existed in successive decades as results of particular policy implementation. Only correlations with a value of $p \leq 0.05$ are included in the data tables. No statistical significance is implied.

Farm size in 1930 is correlated with several economic predictors and one migration variable (Table 5). The year 1930 represented a period of time following two decades of revolution, rebellion, and ineffective land reform. Reductions in the population economically active and the value of farm products in 1930 are both correlated with reductions in farm size. The relationship

continued across the next three decades, with the values of farm products in 1940, 1950, and 1960 also positively correlated with the farm size in 1930.

Table 5. Correlation Analysis of Selected Variables with Farm Size, 1930-1960.

Policy Predictor	Economic Predictor	Migrant Outcome	R	p*
Farm Size 1930	Value ag products, 1930		.8421	.0354
	Value ag products, 1950		.9124	.0112
	Value ag products, 1960		.8635	.0267
Farm Size, 1940	Value ag products, 1940		.8756	.0223
	Value ag products, 1950		.8345	.0388
	Value ag products, 1960		.8127	.0493
		Population--medium towns, 1940	.8552	.0299
Farm Size, 1950	Value of ag products, 1950		.8601	.0280
	Value of ag products, 1960		.8848	.0191
Farm Size,1960		Population--medium towns, 1960	-.8348	.0387

*No implied significance

Farm size in 1940 shows the same positive correlation to values of agricultural products in 1940, 1950, and 1960. The year 1940 represented the end of the Cardenas Era, characterized by much land distribution and attempts at reforming credit policies. For the most part, the results were smaller, inefficient farms. Both the farm size in 1930 and 1940 are positively correlated with the percent of the population living in medium-sized communities (20,000-49,999). Farm size in 1950 and 1960 (Green Revolution) continued the trend of positive correlations with values of farm products. Farm size in 1960 is correlated with a migrant outcome variable-- population of medium sized communities. The correlation is negative, -- as size increased again in 1960, population in medium committees would correspondingly decrease. Remember that population in small communities was declining and population in large communities was increasing at this time.

An analysis of the percent of those employed classified as ejidatarios (Table 6) shows some

Table 6. Correlation Analysis of Selected Variables with Number of Ejidatarios, 1930-1960.

Policy Predictor	Economic Predictor	Migrant Outcome	R	p*
Number of Ejidatarios, 1940		Population--small towns, 1940	.9133	.0109
		Population--small towns, 1950	.8318	.0401
Number of Ejidatarios, 1950		Population--small towns, 1950	.9245	.0083
		Population--small towns, 1960	.8577	.0289
Number of Ejidatarios, 1960		Population--small towns,	.8679	.0250

* No implied significance.

interesting correlations with migration outcome variables. Numbers of ejidatarios in 1930 are not correlated with any economic predictors. However, there are correlations with two migrant outcome variables in later years--population in mid-size communities in 1950 (negative) and population in large communities in 1950 (positive). The ineffective land reforms that occurred by 1930 would not have resulted in substantial ejido formation or resulting impacts on economic indicators.

In 1940, the ejidatarios predictor variable was positively correlated with the percent of employed persons working in agriculture. At the end of the Cardenas Era, many more ejidos had been formed than previously, providing employment opportunities. Economically, the policies of Cardenas, designed to form ejidos as marketing cooperatives, yielded gains in the market place. This is evidenced by the positive correlation between the numbers of ejidatarios in 1940 and the value of farm products in 1950. The number of ejidatarios in 1940 is positively correlated with the populations of small communities in 1940 and 1950. A negative correlation exists for the population of small communities in 1960, a period of substantial decline.

The number of ejidatarios in 1950, midway through the Green Revolution, is positively correlated with the numbers of persons employed in agriculture in 1960, and the population of small communities in both 1950 and 1960. In 1960 the same positive correlation exists between numbers of ejidatarios and populations of small communities.

Table 7. Correlation Analysis, Economic Predictor Variables with Migrant Outcome Variables.

Economic Predictor	Migrant Outcome	R	p*
Population economically active, 1930	Population--large cities, 1930	-.9219	.0089
Population economically active, 1940	Population--medium towns, 1940	-.8504	.0319
Population economically active, 1950	Population--large cities, 1950	.9024	.0138
	Population--large cities, 1960	.8594	.0283
Employed in ag 1930	Population--large cities, 1930	-.9219	.0089
	Population--large cities, 1940	-.9180	.0098
	Population--large cities, 1950	-.8804	.0206
	Population--large cities, 1960	-.8225	.0445
Employed in ag, 1940	Population--small towns, 1940	.8986	.0149
	Population--large cities, 1940	-.9337	.0065
	Population--small towns, 1950	.9285	.0075
	Population--large cities, 1950	-.8880	.0181
	Population--small towns, 1960	.8929	.0166
Employed in ag, 1950	Population--small towns, 1950	.9103	.0177
	Population--large cities, 1950	-.9396	.0054
	Population--small towns, 1960	.9077	.0124
	Population--large cities, 1960	-.9374	.0057
Employed in ag, 1960	Population--small towns, 1960	.9211	.0091
	Population--large cities, 1960	-.9258	.0080
Poverty level, 1960	Population--small towns, 1960	.8293	.0412

* No implied significance

The percent of worked land that was irrigated appears to have little association with economic predictor or outcome variables. The percent in 1930 was the only one to show any relationships--a positive correlation with the population economically active and the value of farm products in 1930. There were no relationships with migrant outcome variables nor any relationships defined for subsequent decades. This is not surprising since government policies favored irrigation in regions other than the North Center.

The construct of economic predictors also shows some correlations with migrant outcome variables (Table 7). The greatest number of associations was between those employed in agriculture and populations of both small and large communities, 1930-1960. The value of agricultural products was not associated with any population variable; poverty level also shows little association. Clearly, the job market, particularly in regard to agricultural employment, appears to be associated with population. Positive correlations exist for numbers employed in agriculture and the population of small towns. Negative correlations exist for agricultural employment and the population in large cities. These correlations reach across succeeding decades. Since the relative numbers of persons employed in agriculture declined, overall, between 1930 and 1960, there were corresponding declines in populations of small towns and increases in populations of large cities. Overall economic activity had a similar association with population in most instances.

Several trends are noticed upon review of the correlation analysis data. Farm size changes between 1910 and 1960 (1930 values reflect policies between 1910-1930) had the greatest association with values of agricultural products. There is little association with population trends. Irrigation policies correlate very little with economic or migrant outcome variables. The percent of all workers classified as ejidatarios, signifying the formation (or dissolution) of ejido holdings is frequently correlated with population trends. The economic predictor variables, particularly those dealing with employment, are associated with population in large and small communities.

Conclusions

The agrarian policies of Mexico, formulated in an attempt to create rural democratization, have failed miserably. An examination of the North Center region revealed than an increase in ejido holdings and numbers of small, private farms, without the necessary support systems, resulted in decreased value of products and encouraged movement out of the rural areas. The breakup of the haciendas destroyed viable employment and social structures. Policies which continued to favor large landowners made it impossible for the small farmer to succeed. Since the hacienda was no longer an alternative, failing and bankrupt farmers left the rural areas for employment elsewhere. A summary of the three major social-political eras follows.

I. 1910-1930: Revolution and Rebellion

Land reform was occurring at a slow pace. Lack of credit and other supports prevented small farmers from achieving success. Large landowners still received the majority of any assistance available. Much cropland had been destroyed and many people left the North Center between 1910 and 1920. Haciendas no longer were the dominant social organization. The value of agricultural products declined with declining farm size.

II. 1930-1940: The Cardenas Era

Priorities were given to land distribution policies and attempts to reform credit systems. However, unequal distribution of resources to favor large landowner was still occurring. Large numbers of ejidos were formed, stabilizing the population of the smaller and mid-sized communities. Toward the end of Cardenas administration, many small farmers were losing money, going bankrupt, and their holdings were being absorbed into larger farms. By 1940, rural outmigration began to increase.

III. 1940-1960: The Green Revolution

Policies continued to favor the larger farming operations. Declines in ejido holdings and numbers of ejidatarios, and reduced numbers of in non-ejido agricultural jobs resulted in continued out-migration in the rural sector. Populations of small communities declined and population of

larger communities increased. As average farm size increased due to policies which favored large-scale production, the value of agricultural products increased.

Educational and Policy Implications

Conditions which created massive rural outmigration in the North Center lead to important implications for agricultural and extension educators in the region. The relationship between employment opportunities and outmigration indicates the need to provide viable employment alternatives. These alternatives can best be accomplished through education. The farmers which were able to achieve success were those able to take advantage of resources and supports provided by government policy and US aid. Extension programs and government policies which increase awareness and retrieval of resources available would benefit all landowners in the area. Additional extension responsibilities could focus on developing skills and knowledge of those persons desiring employment on large farms since these operations have maintained economic viability.

A second implication is one based on the recognition of the results of land reform policies in an effort to prevent a reoccurrence. Traditionally, the better qualified individuals are ones to leave an area of origin. A better understanding of how policies influenced people's lives and behaviors would enable current and future policy programmers to develop and implement better programs. The result of this study underscores the need for better policies and more effective mechanisms and personnel in order to successfully implement programs. Therefore, education is a key to preparation of farmers, extension personnel, and policy makers that can successfully deal with the economic and social problems of the rural sector in Mexico.

From an historic perspective, agricultural and extension educators in the United States need to be aware of the environment out of which so many of our migrant workers have come. A sensitivity to the long-term conditions which have existed in the North Center can lead to programming based on clients' needs, circumstances, and frames of reference.

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An Agricultural Supply and Equipment Business and its Socio-economic Impacts on a Rural Community: A Case Study in Mali

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Introduction

Classified among the low income developing countries, the Republic of Mali is located in central West Africa, and covers 1,240,142 sq. kms. Eighty percent of its population live in the rural areas, and exist mainly from cereal production--millet, maize, sorghum and rice. Subsistence agriculture based upon shifting cultivation is the common production pattern in the country. Because of the erratic tropical Sahelian conditions, the low investment level in agriculture in general, and the failure of most of the publicly funded rural development projects, a private sector has recently been initiated in Mali.

Specifically, in 1987, an agricultural supply and equipment business, the Representation Commerciale et Industrielle du Mali, or RECOMA, implemented a contract-based cooperative development effort with a group of farmers in the locality of Welesebugu. Welesebugu is a "rural city" located 75 kms. south of the capital Bamako, and the RECOMA responded to the need of its cooperative for semi-mechanized agriculture for two main reasons.

First, a reform had occurred through the 10 year old USAID funded project in the area, the Operation Haute Vallee du Niger, or OHVN, which had already familiarized the local farmers with short-term loans and credit. The process of self management and individual investment was encouraged by the US agency, which had the adoption of higher entrepreneurial types of farm production in perspective for its last program in Welesebugu.

Second, the RECOMA, as a small farm supply and implement business, was interested in expanding its domestic market in a rural region where the mechanization process is considered most advanced among all the Sahelian states. The private business, for the first time, was also testing several innovative commercial strategies that had integrated some local sociological considerations directed at the relatively poor farm families. Because of the interest in plows, seeders, sprayers, fertilizers and pretreated seeds expressed by the farmers in the Welesebugu area, RECOMA personnel were convinced that a cooperative venture, involving sales of equipment and supplies on credit, would succeed.

Purpose

How and why such a particular ambition from a commercial business could materialize and survive in a traditionally conservative environment where most development efforts have been sponsored by heavily funded government and donor agencies is a relevant issue for agricultural policy reform and extension in Mali. It even suggests several inquiries and implications concerning the traditional governmental rural

development projects in tropical semi-arid Africa in general. Thus, the purpose of this research was to provide information to the government planners and private enterprises regarding the potential that lies in such a form of direct interaction between private agricultural implement businesses and organized groups of rural producers.

Several questions were formulated to help define the format and the final objectives of the case study. They were as follows:

1. Why were the Welesebugu cooperative leaders so receptive to RECOMA's new marketing strategy, and to what extent did the contract-based credit influence the purchases of farm implements?

2. How did the production patterns and crop sales relate to the agricultural equipment levels and investment and saving procedures?

3. How do people, today, feel about recent changes in their community, and which good or bad aspects of it do they attribute to the cooperative efforts initiated by RECOMA?

Method

An in-depth study of the Welesebugu case was conducted for two months, in July and August 1992, to investigate the influence the cooperative model has had on the people and community of Welesebugu. A series of personal interviews were held with 68 farmers and community leaders who had conducted the most business through the contract-plans, including 20 village counselors and 14 woman leaders. Also interviewed were 12 USAID advisers of the OHVN project, and 22 RECOMA personnel. Analyses of the farm implement purchases, of production patterns, and of family budgets were used to obtain data for the study. The relationships between the credit levels that individual farmers, or their households reached, the social outcomes and attitudes directed at, or derived from those levels, and the individual purchases of farm equipment were considered important parameters within the study. A partial analysis of the fluctuations of the village cooperative budget was also an interesting performance indicator.

Findings

While it has often been assumed that large scale rural projects are the solution to the food insecurity problem in Africa, and that only heavily financed public agencies can undertake development projects appropriate for the growing population, the RECOMA-Welesebugu model tends to prove that small mechanization operations, that put emphasis on flexible credit and productivity, can be an effective option. The major constraint is not the reluctance of farmers to change, but rather the institutional framework which does not provide the rural producers with a friendly credit system to purchase farm implements.

Although it was a new commercial partner, in 1987, with less than local currency CFA 2 million sales ($8,000) in the Welesebugu area, the RECOMA reached total sales worth CFA 3,028,000 ($12,112) from individual contracts by the end of 1988. Farm implements and supplies were contracted and delivered to the heads of seven extended families, each family receiving a multipurpose plow, a seeder, urea and complex fertilizers, pretreated seeds, and a monetary loan for renting or paying bulls. In early 1989, the figure increased to CFA 12,270,000 ($49,080), as the cooperative managers entered a full mechanization option with the purchase of a tropicalized tractor.

Analysis of data indicates positive impact of associative decision-making in Welesebugu through cooperative development. During the 1989 growing season, besides the individual lands, the total 19 hectares of the village collective fields were exploited for the first time in almost a decade--since 1980--for rice (6 ha), maize (8 ha), and peanut (7 ha) production, with the last two crops produced simultaneously on 2 hectares. The cooperative owned security stocks were generated after harvesting at that time, with about 15 tons.

The decentralized information processing system that the cooperative became in the end supported the development of several family micro-projects besides the direct farm activities. Local initiatives that are related to product distribution and services expanded from the investment of the extra revenue generated from higher crop sales. Gardening, transportation, bookstore, and construction materials became important complementary revenue sources.

Malnutrition and other nutrient deficiency diseases have also considerably declined in the locality; from 40% of all the pupils in the first three levels of elementary school in 1985 to 17% at the time of the study, according to the school board. Rotative cereal agriculture is fully applied in 100% of the Welesebugu vicinity, and the average productivity per hectare for cereals (850 kg/ha) is above the standard in Mali (550-600 kg/ha), although it comes second after the CMDT-textile development project zone in the country.

Concomitantly, the common funds for both men and women's cooperatives have all increased by at least 65%, passing from, respectively, CFA 821,315 ($3,285) and nothing in 1988 to CFA 1,103,555 ($4,414) and CFA 487,570 ($1,950) in 1990. The more recent monetary gains were to be recorded in the bi-annual reports at the time the study was conducted, but the estimations for 1992 doubled these previous figures. Individual loans with the local banks for equipment purposes have also regularly increased by 100% every two years since 1988, with credit available in the amount of about CFA 37 millions ($150,000) today.

Very different from the group of producers of 1985-1987 who were receiving complementary food assistance from the Mali food security project, the Welesebugu community leaders are, nowadays, rural entrepreneurs who are interested in even a 20 year-cooperative project with the RECOMA. The two partners are looking forward to such a challenge, but face some readjustment procedures in order to undertake that step.

Importance

As surprising as it may be, the study found that the Welesebugu farmers initiative is strongly reorienting the development perspectives as well as the ongoing expansion program of the RECOMA business. A commercial enterprise with diverse interests in the industrial sector for its major activities until 1987, the RECOMA is currently turning into a promotor of rural development via its technical assistance to a village cooperative. The restructuring process and the credit requests that the business is pursuing now raise some questions about its eventual success, and generate some skepticism for the large scale activity it intends to perform, but the project does underscore the value of private enterprise in agricultural and community development. For a developing country like Mali confronted with frequent food production problems, the national agencies, governmental departments, and their specialists in planning and agricultural extension should not fail to recognize the potential impact of village development programs internally generated in cooperation with private enterprise.

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STRUCTURAL TRANSFORMATION IN THE INDIAN AGRARIAN SECTOR: IMPLICATIONS FOR EXTENSION PROGRAM DEVELOPMENT

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Introduction

India is predominantly an agrarian country with 70% of its people depending on agriculture for their livelihood, with the agricultural sector contributing approximately 50% to the gross national product. Over the years, India has made tremendous strides in agricultural development that has contributed to the country being self sufficient in food production. Despite the success achieved in agricultural development, certain problems are predominate on the Indian agricultural scene. One problem that has slowed the pace of agricultural development is the structural transformation in the Indian agrarian sector. Structural changes are necessary to make the system responsive to developments in the socio-political scene, national mandates and priorities, etc. It has been the experience in many developed countries that appropriately designed structural changes in the institutional and organizational structure, especially the agricultural sector, have made long-term viable improvements that have contributed substantially to progress and development.

According to Ramanna, Bisalaiah and Chengappa (1986), structural transformation in the agrarian sector of a given country or a region is one of the major facets of the development process. Structural transformation may assume different forms including shifts in land ownership, number and size of holdings, number of fragments per holding, average size of fragments and productivity of land through technological and institutional innovations. Three dimensions of this structural transformation deserve special identification in the context of the present study: (1) examination of census data for the past three decades which suggests that the percentage of small and marginal holdings to total holdings has increased;(2) decline in land-man ratio due to increasing population pressure; and (3) land fragmentation.

Several studies have revealed that the agrarian structure in India is characterized by the incidence of tenancy, landlessness, high degree of fragmentation, and a skewed distribution of owner holdings resulting in lower yields and higher cost of production per unit of output (Mamoria, 1983; Pandey & Swarup, 1981; Ramanna, et al., 1986). A brief discussion on fragmentation and sub-division of land in the context of this paper is warranted.

As indicated earlier, not only are the operational holdings small, but they are also fragmented. They are found not in one compact block but in tiny plots scattered all over the area. Fragment may be defined as a distinct and exclusive piece of land not connected to any other piece of land. In other words, the term fragment refers to small plots situated some distance from one another. The factors associated with fragmentation and sub-division are multifaceted. These include: (1) laws of inheritance and succession, (2) break-up of the joint family system, (3) high pressure of population on land, (4) lack of off-farm employment opportunities, and (5) governmental sponsored land reform measures.

Figure 1 illustrates the process of fragmentation and sub-division in the traditional Indian rural society. In a span of 60 to 70 years, spread over three to four generations, the land has become fragmented into small, tiny, and often uneconomic holdings. With each

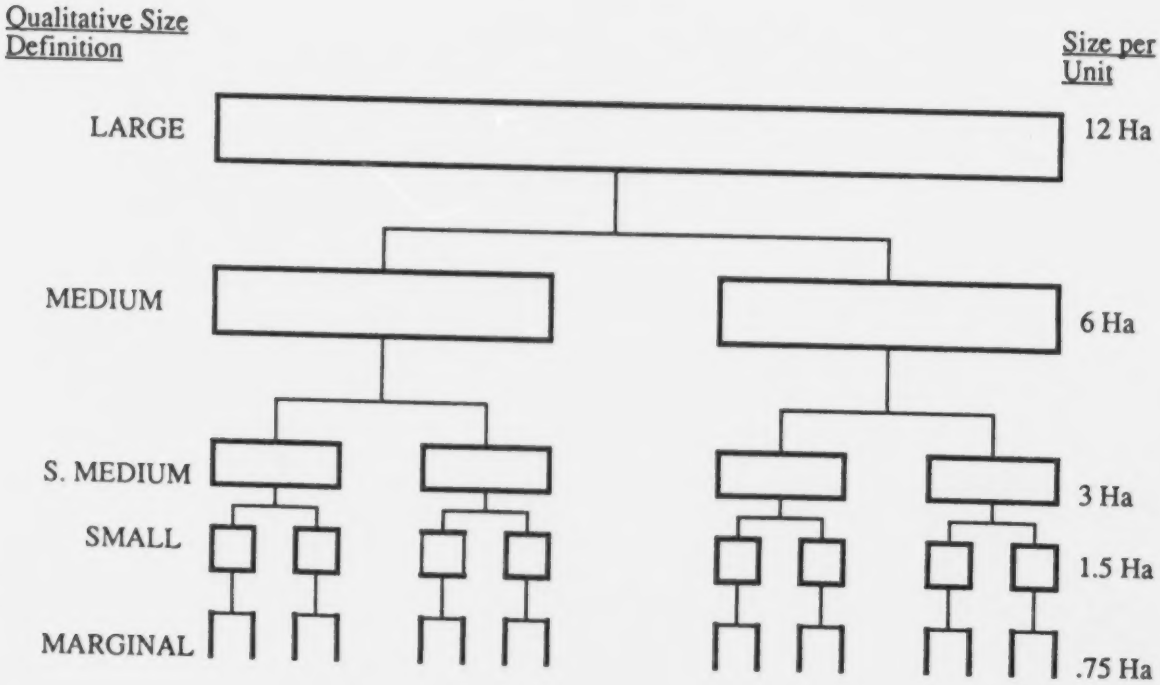

FIGURE 1: PROCESS OF SUB-DIVISION AND FRAGMENTATION

successive generation, the land gets smaller and smaller. The consequences of excessive fragmentation include rising cost of production, bringing down the yield per unit of land and labor. In areas where soils are traditionally poor and the average yields are low, this problem is further aggravated.

The alternative to fragmentation is consolidation. Consolidation of holdings is of major interest in many developing countries engaged in efforts to improve their agrarian structure. Consolidation refers to regrouping of plots in order to make holdings more compact. Several studies have indicated that the operational efficiency of the farm increases as a result of consolidation. Many states in India have enacted legislation to implement and facilitate consolidation of holdings. The implementation has been extremely patchy and sporadic. Only a few states have made some progress in this effort. It appears that there is a lack of awareness among farmers and the general public about the legislation promoting the consolidation of holdings. In a survey of 2640 farmers in a southern state, Ramanna et al., 1986, reported that only 29% of the farmers were aware of the legislation and only 7% approved of the existing legislation. In the same study, farmers were asked to indicate the most favored method of pooling the land. The most favored methods found were the sale to the owner of an adjacent plot (72%), sale to the farmer of their choice (33%), exchange of plots between farmers (74%), exchange of plots between farmers and government (31%) and joint cultivation of fragments (24%).

According to Boyle (1981), the goal of any educational program, especially extension, is to help people accomplish something that will benefit them. Identification of the problems, issues, and concerns that need improvement are the critical challenges of program development. Further, it is important to collect, analyze, and present data, facts, and trends to effectively understand the situation. Such analyses of data will help develop a greater understanding of the problem and provide a basis to establish program responsibilities and limits.

In this paper, we attempt to examine the trends in number and size of agricultural holdings in India during the last three decades. In addition, projections for the year 2001 are also made. Implications of these trends on extension program development, the focus of this paper, as well as proposed changes in the nature of extension programming are also discussed.

India is not alone in experiencing a structural transformation in the agrarian sector. The structural transformation that has taken place in India reflects similar trends that are occurring in almost all old peasant communities in Africa and Asia.

Purpose

The major purpose of the study was to examine the trends in number of agricultural holdings, operational area of holdings and average size of holdings in India for three decades (1971-91), and make projections for 2000-2001. Based on the trends, projections for the number of holdings, operational area and average size of holdings were also made for the year 2000. Results of these analyses help to understand the structural transformation in the Indian agrarian sector and provide an additional basis to develop priorities for extension program development and for extension programming.

Methods and Data Sources

The data for this study were obtained from the census reports of India for the years 1970-71, 1980-81, and 1990-91. Trends examined included the total number of

operational holdings, area of operational holdings, and average area of operational holdings under five land size classes. The five land size classes are:

1. Marginal (less than 1 hectare or 2.47 acres).
2. Small (1- 2 hectares or 2.5 - 5 acres).
3. Semi-medium (2.01-4.0 hectares or 5.01 - 10 acres).
4. Medium (4.01 - 10 hectares or 10.01 acres - 25 acres).
5. Large (10.01 hectares or over 25.01 acres).

An operational holding is defined as "land which is used wholly or partly for agricultural production and is operated in one technical unit by one person alone or with others without regard to title, legal form, size or location" (Desai, 1983, p. 17).

Data were analyzed using frequencies and percentages. Projections for 2000-2001 were calculated using logs and antilogs. The standard formula used in arriving at projections are:

$$\text{Antilog} \quad 1/N \quad \log \quad \frac{\text{Terminal year value}}{\text{Base year value}} \quad - 1$$

where N= Total number of years

The value thus obtained was multiplied by 100 to arrive at the percent compound rate per annum (r).

$$P_t + P_o (1 + r/100)^t$$

where Pt = value in the year "t"
Po = value in the initial year/base year
r = compound growth rate (%)

Results and/or Conclusions

Operational Holding - Area Projections

The trends and projections for the number of holdings, operated area and average size of holdings are presented in Table 1. Examination of data in Table for the three decades (1970-71 to 1990-91) revealed that the number of holdings increased from 71 million holdings in 1970-71 to 114.45 million holdings in 1990-91; an increase of 43.45 million holdings (61.2% increase). On the other hand, the operational area during the three decades increased only marginally by 4.8%. Data also suggest that the total number of holdings as well as the operational area will be 148.6 million and 183.7 million hectares respectively by the turn of this century. The estimated average size of holding is projected to be 1.2 hectares. When examined across different size classes, the analysis indicated that the total number of holdings as well as operational area of holdings increased in all size classes with the exception of large size class (Table 1). Marginal and small holdings showed the largest increase (82%), followed by semi-medium (36%), and medium (3.7%). The number of holdings in the large size class, however, decreased by 39%.

Data presented in Table 1 indicate that a little over 75% of the holdings were in the marginal/small size category operating in a little over 30% of the total area. In sharp contrast, large holdings which accounted for 1% of the total holdings operated in about

16% of the total area. This finding highlights the numerical predominance of marginal and small farmers in the Indian agricultural scene. This change has come about at the expense of large holdings. The projections indicate numerical predominance of small and marginal holdings which will continue by the end of this century. That is, 82% (121.9 million) of holdings in the marginal and small category will operate in about 39% (69 million hectares) of the total operated area by the turn of the century.

Educational Importance

The data analysis results have several implications for extension, especially as related to program planning and development. Farm sizes will theoretically continue to decrease and become less economically viable, potentially resulting in limited improvement and investment in land. A greater number of farm families operating smaller holdings will need to be reached by extension. From an extension programming perspective there appear to be three areas in which extension may play an important role. First, Indian farmers need to have more information in an understandable form regarding the existing legislation and implementation plans related to land subdivision, fragmentation and consolidation. Such informational extension programming should involve local farmers and community leaders in discussing how such governmental policy and implementation guidelines affect the farmer currently and the future generation of farmers in light of the Indian cultural expectations, values and norms. Such informational extension programs must also include an emphasis on how the governmental policies will influence the economic well being of the farmers. Thus this extension informational programming takes on an educational developmental programming perspective as described by Boyle (1981).

Secondly, extension personnel have an opportunity to develop with farmers and deliver for those who remain in farming programs which directly address the needs of those with limited land. Especially needed are educational initiatives which suggest alternative approaches to operating individual, fragmented small holdings. It is important for extension to assume a leadership role in facilitating the establishment of demonstration projects, such as a cooperative farming project, to provide farmers with alternative options for operating traditional agricultural operations. Extension should also develop initiatives for farmers to examine alternatives to traditional agriculture. However, such alternative agriculture considerations must also include an assessment of the availability of required supporting infrastructures. Without the availability of the required infrastructure, alternative agricultural production options would most likely result in farmers with increased expectations and increasingly higher frustrations and disillusions.

A third role for extension relates to helping people examine alternatives to participation in agriculture to earn a living. It is unlikely that farmers will continue to be able to survive economically based on future projections of land fragmentation. Extension personnel should examine potential program efforts which may assist those who desire to leave farming to find alternative ways to earn a living. Such an effort would obviously require a multidisciplinary approach which is based on the needs of people, rather than governmental imposed programs which may be viewed as disrupting the norms of a society and specifically the lives of individuals.

Table 1
Trends and Projections in Number of Holdings, Operational Area and Average Size of Holdings (1970-71 to 2000-01) by Land Size Class.

Land Size Class	Year 1970-71	1980-81	1990-91***	2000-01***
Marginal & Small				
Number of holdings*	49.63 (70%)	66.68 (74%)	89.97 (79%)	121.88 (82%)
Area**	33.84 (21%)	42.73 (26%)	54.19 (32%)	69.00 (37%)
Average size	0.40	0.39	0.38	0.37
Semi-medium				
Number of holdings	10.68 (15%)	12.48 (14%)	14.57 (13%)	17.02 (11%)
Area	30.00 (18%)	34.53 (21%)	39.75 (23%)	45.76 (25%)
Average size	2.81	2.77	2.73	2.69
Medium				
Number of holdings	7.93 (11%)	8.09 (9%)	8.23 (7%)	8.39 (6%)
Area	48.23 (30%)	48.31 (30%)	48.39 (28%)	48.47 (26%)
Average size	6.08	5.98	5.08	5.78
Large				
Number of holdings	2.78 (4%)	2.16 (2.5%)	1.68 (1%)	1.31 (1%)
Area	50.06 (31%)	37.17 (23%)	27.60 16%)	(20.50 (11%)
Average size	18.09	17.24	16.42	15.63
Totals				
Number of holdings	71.01 (100%)	89.39 (100%)	114.45 (100%)	148.59 (100%)
Area	162.06 (100%)	162.76 (100%)	169.93 (100%)	183.71 (100%)
Average size	2.30	1.82	1.47	1.20

* in million; ** million hectares; *** projected figures

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Session C

ASSESSMENT OF EXTENSION SYSTEMS

Paper #1. **AN ASSESSMENT OF THE FARMING SYSTEMS RESEARCH/EXTENSION APPROACH TO TECHNOLOGY TRANSFER AMONG RESOURCE-POOR FARMERS IN THE MIDDLE-BELT REGION OF NIGERIA**
by
Adewale Johnson Alonge and Robert A. Martin
Iowa State University

Paper #2. **THE WORLD'S LARGEST EXTENSION SYSTEM "EXTENSION IN CHINA"**
by
Henry M. Bartholomew
Ohio State University Cooperative Extension Service

Paper #3. **AGRICULTURAL EXTENSION PROBLEMS AS PERCEIVED BY EXTENSION OFFICERS IN IMO STATE OF NIGERIA**
by
Okechukwu M. Ukaga and Rama B. Radhakrishna
Penn State University

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An Assessment of the Farming Systems Research/Extension Approach to Technology Transfer among Resource-poor Farmers in the Middle-Belt Region of Nigeria.

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A paper accepted for presentation at the 1993 AIAEE annual conference, being held 18-20 March, 1993 at the Howard Johnson's/National Airport, Arlington, Virginia.

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INTRODUCTION

The wide gap between technological production possibilities and the persistent low level of agricultural production in Sub-Saharan Africa has been an issue of concern in the agricultural development literature for decades. Many different agricultural development models ranging from the classical technology diffusion, community development, Green Revolution and integrated rural development have been adopted over the past three decades with little success (Feder et at., 1985). Food-production in the region is still largely dominated by subsistence, low technology-utilizing traditional producers. Hence, many countries in the region still face serious food-deficit problems resulting in the depletion of scarce foreign exchange on food importation. For instance, it was estimated that the Nigerian food import bill increased in per capita term from a value of about $2 in 1970 to a staggering $39 in 1980 (Pinto, 1987).

The Farming Systems Research/Extension (FSR/E) approach emerged in the mid 1970s and early 1980s as an alternative to past development approaches whose top-down orientation was perceived as a limitation to their efficacy for bringing about sustainable development (Merrill-Sands, 1988; Biggs, 1989). The general feeling in agricultural development circles was that conventional agricultural research methodology, which relied solely on on-station research was producing agricultural technologies that were only appropriate for resource-rich farming systems that approximated the conditions under the research station (Biggs, 1989; Chambers and Jiggins, 1987). Hence, the FSR/E approach which seeks through on-farm research and associated extension activities, to test, adapt and integrate, and disseminate new technologies for adoption by resource-poor farm-households, was seen as a viable alternative to conventional Transfer of Technology (TOT) models. While many variants of the FSR/E approach exist, it usually involves the following sequence of activities: (i) selection of target homogeneous recommendations domain and research area, (ii) identification of farming systems constraints and development of a research base, (iii) planning on-farm research, (iv) on-farm research and analysis, and, (v) extension of appropriate technologies. Each of these five activities should involve the active participation of the farm-households, working with a multi-disciplinary research team (Shaner et al., 1981).

The FSR/E approach generated so much confidence in the development community that by the mid 1980s, literally hundreds of projects purporting to be using the approach were being funded in many less developed countries (LDCs). For instance, Anderson (1985) estimated that close to 15% of the total budget of the International Agricultural Research Centers (IARCs) was being devoted to FSR activities, while many National Agricultural Research Programs in the third world countries were also committing a substantial proportion of their budget towards FSR/E activities. However, two decades after the emergence of FSR/E and hundreds of millions of dollars in financial commitment, the approach has recently come under intense criticism from both theoretical and methodological perspectives. For instance, Marcotte and Swanson (1987) noted that like most other past top-down TOT approaches, FSR/E has its theoretical roots in structural functionalism and as such only represented a change in form and not in substance. Hence, it is argued that FSR/E is subject to the promise and limitations of the modernization approach. The implementation of farmers' participation, the core of FSR/E, has also come

under intense criticism from those was contend that existing institutional rigidity in most national and international research and extension systems is antithetical to the achievement of bottom-up participatory development (Biggs, 1989; Sumberg and Okali, 1988; Chambers and Jiggins, 1987). Sumberg and Okali (1988), observed that many FSR/E projects were nothing more than the on-farm validation and demonstration of technologies already developed and evaluated on experiment stations without farmers' input. Hence, farmers' participation in the technology-development process is often reduced to the supply of the plots and the labor for the validation of technologies. Hence, there have been calls for an evaluation of the contribution of FSR/E to agricultural development in the LDCs. Norman (1989) observed that twenty-five years after its over-enthusiastic acceptance, the challenge to FSR/E in the 1980s was the dilemma of accountability, and the measured withdrawal on the part of donor agencies just when many national programs were in the process of institutionalizing the approach.

PURPOSE and OBJECTIVES

The purpose of this study, therefore, was to assess the impact of a FSR project implemented by the International Institute of Tropical Agriculture (IITA) on the adoption of agricultural innovations by farm-households in a major Agricultural Development Project (ADP) located in Niger State in the middle-belt region of Nigeria . The study was carried out within the original Bida Agricultural Development Project (Bida ADP) which was implemented by the Nigerian government with a loan from the World Bank. In 1983, the IITA located in Ibadan, Nigeria, established a FSR project in selected villages within the Bida ADP area with the purpose to develop technologies for lowland rice production within the numerous inland valleys located in the area. The IITA's Farming Systems Research activities in the inland valleys focused on three broad objectives: (1) the development and testing of on-farm research methods adapted to the farming systems of the humid and sub-humid regions of Africa; (2) dissemination of these methods through training and cooperation with on-farm research of national agricultural research centers; (3) testing of IITA's technologies under farmers' conditions in order to assess their adaptability and identify new research needs (Spencer, 1991; Palada et al., 1986). Inland valleys (also known as fadama) are flat-floored and relatively shallow valleys that occur extensively in the undulating plains and plateaus of most African landscape, whose hydromorphic soils have long been recognized for their huge potential for rice production (Andriesse, 1986). This study was conducted in collaboration with the IITA between June, 1990 and October, 1992 to assess farm-households' adoption of a recommended package of innovations for rice-production within the Bida ADP. The specific objectives of the study included: (1) To analyze and describe important socio-cultural, institutional and human capital variables impacting the organization of the farming systems within the area; (2) To assess differential innovation adoption between FSR participants and non-participants farm-households; (3) To determine important variables predictive of farm-households' adoption of innovation.

METHODOLOGY

The study adopted a descriptive survey design. A triangulation approach which involved non-participant observation, unstructured group interviews and quantitative structured interviews with farm-household heads was adopted in data collection. The project area was estimated to contain a total of 94,934 farm-households (Niger State ADP, 1990). Since there was no existing sampling frame containing a list of all the farm-households within the project area, a multi-stage cluster sampling frame was developed. Thirty wards/villages were selected from a listing compiled by the project's extension service which contained all the local governments (counties), towns, villages and wards located within the project's boundaries. During the first phase of data collection, 8-10 farmers were each purposively selected from ten of the villages for unstructured exploratory group interviews. On the basis of the exploratory survey, the final interview

schedule for the second and third phases of data collection was developed. The instrument was pre-tested on thirty farm-households not included in the final survey. The instrument was then validated by a team of experts drawn from the IITA, the University of Ibadan, Nigeria and the department of Agricultural Education and Studies at the Iowa State University. Other forms of instrument reliability checks conducted included test-retest of the enumerators who conducted the interviews, and a post-hoc test. From each of the remaining twenty villages, twenty farm-households were randomly selected for structured interviews during the second phase of data collection. However, only 364 interviews were completed due to sample attrition. The third phase of data collection involved all the 149 farm-households from five villages who participated in the FSR project. The collected data were coded and analyzed using the SAS package on a computer mainframe. Descriptive and inferential statistical procedures such as frequencies, chi-square, t-test and multiple regression were used.

The study was predicated on the systems approach, hence, data collection was under-girded by a conceptual model which incorporated relevant elements of the interdisciplinary adoption model developed by Leagans (1979) and the FAO's Farm-household system model (FAO, 1989).

Results and Conclusions

On the basis of the objectives of the study and the analysis of data, the following findings and conclusions were obtained:

Analysis of the sociocultural, institutional and human capital variables impacting the local farming system: Most of the respondents were predominantly resource-poor subsistence farmers. The mean farm holding per household was just over two hectares, consisting of a mixture of upland and lowland fields. The farming system is characterized by shifting cultivation and mixed cropping. A majority of the respondents, 81.6%, were illiterates. Agricultural production is organized along extended family structure, with the family members providing the bulk of the labor. The dominant land tenure system in the area was through family inheritance or usufruct rights. It is however, pertinent to note that the traditional norms regarding inheritance rights were biased against women, most of who relied on their husbands for land. This factor in concert with other sociocultural norms, such as the dominant Islam religion could explain why very few women were involved in individual crop production.

In terms of access to agricultural support services, the data in Table 1 show that a large proportion of the farm-households did not have access to critical agricultural support services such as agricultural extension, credit, input supply and irrigation facilities. For instance, only 50.3% and 45.8% of FSR participants and non-participants, respectively, had access to agricultural extension services, while a much larger percent (over 70%) did not have access to input supply centers. Also, over 90% of the farm-households did not have access to either agricultural credit and irrigation facilities. While FSR non-participants seemed to enjoy statistically higher institutional contact than participants in terms of access to irrigation facilities, the two groups were generally comparable in terms of their low level of access to agricultural support services. This is attested to by the fact that a majority of the respondents (ranging from between 50% and 70%) regarded inadequate facilities for input distribution, high cost, incompatibility with farming systems and inaccessibility as the major constraints to the adoption of recommended agricultural inputs such as fertilizer, seed dressing, insecticides, herbicides, and mechanization.

In the same vein, most of the respondents did not perceive the recommended modern varieties (MVs) of lowland rice as offering a clear-cut advantage over traditional varieties. For instance, while recommended MVs were perceived by a majority of the respondents (over 60%) as being superior in such characteristics as yield, early maturity, and profitability, a similar majority rated them inferior to traditional varieties in terms of pest resistance, weed tolerance, storage quality and accessibility.

Table 1. Chi-square analysis of the differences in access to agricultural support services between FSR participants and non-participants

Services	Percent FSR Participants	Percent for FSR non-participants	Chi-square Value
Extension Services	50.34	45.83	0.774^{NS}
Farm Service center	29.53	31.82	0.233^{NS}
Agricultural Shows	27.52	39.39	5.897*
Agricultural Radio program	96.64	84.09	14.883***
Agricultural credit	10.74	6.06	2.916^{NS}
Agricultural Television program	9.40	18.94	6.624**
Access to irrigation	5.41	12.12	4.879*

NS=Not significant at .05 level
*** Significant at 0.001 level
** Significant at 0.01 level
* Significant at 0.05 level

The adoption of the recommended innovations: One of the major objectives of the study was to identify differential innovation adoption between FSR participating and non-participating farm-households. Innovation adoption was measured in terms of the percentages of farm-households that had adopted different components of a recommended technological package which included improved varieties of rice, fertilizer, seed dressing, herbicides, insecticides and water management techniques along the fadama fields. Differential innovation adoption was also analyzed in terms of adoption intensity for fertilizer, improved varieties and overall adoption index. Overall adoption index was defined as the proportion of the technological package adopted by the respondents. The data presented in Table 2 show the distribution of FSR participants and non-participants according to the percentage that had adopted components of the technological package.

Table 2. Chi-square analysis of the differential innovation adoption between FSR participants and non-participants

Technologies	Percent adopters FSR participants	Percent adopters Non-participants	Chi-square
Fertilizer	93.96	98.18	00.09^{NS}
Insecticides	11.41	03.41	10.33***
Seed dressing	18.12	33.71	11.46***
Herbicide	04.03	05.68	00.54 ^{NS}
MV fadama rice	73.15	18.94	118.24***
Water control	81.88	64.02	14.60***

*** Significant at .001 level
NS Not significant at .05 level

Chi-square analysis showed that FSR participants achieved statistically higher adoption rates for improved rice varieties, insecticides and water control techniques than non-participants. However, non-participants achieved higher adoption rates in terms of seed dressing, while there were no significant differences between the two groups in terms of the adoption of fertilizer, herbicides and their overall adoption index.

The data in Table 3 show the T-test analysis of differential adoption intensity between FSR participants and non-participants. An analysis of the data in Table 3 indicates that FSR participants achieved a higher innovation adoption intensity than non-participants. For instance, while modern rice varieties accounted for 52% of the total holding for FSR participants, the coverage for non-participants was just 15%. Similarly, the average fertilizer input of 4.91 bags per hectare for FSR participants was statistically higher than a mean fertilizer input of 3.61 bags reported by non-participants. Hence, the findings of this study provided support for the hypothesis that there was a significant difference in the adoption of recommended agricultural innovations between FSR participants and non-participants.

Table 3. T-test analysis of differences in the intensity of technology adoption between FSR participants and non-participants

Innovations	MEANS FSR	MEANS Non-FSR	T-VALUE
Proportion of MV adopted	0.52	0.15	9.56***
Fertilizer adoption intensity	4.91	3.61	4.31***
Overall adoption index	2.82	2.78	0.50NS

*** Significant at .001 level
NS Not significant at .05 level

The variables predictive of innovation adoption: The multiple regression analysis of variables predictive of farmers' adoption of modern rice varieties is shown in Table 4. The model included independent variables such as respondents' human capital endowment, their access to institutional support and perceptions regarding the comparative advantages of modern over local rice varieties. Of all the variables included in the interdisciplinary conceptual model developed to predict the farm-households' adoption of innovation, only those related to the institutional constraint and technology-related models were significant at the .05 level. On the contrary, most variables characteristic of the classical diffusion model such as respondents' personal and farm firm characteristics such as age, level of education, farm size, income, and family size were not. For example, the multiple regression model developed to predict respondents' adoption of improved fadama rice varieties showed that farmers' participation in FSR, their perceptions of the comparative yield, accessibility, early maturity, and profitability advantages of MV over local varieties, their access to input supply, irrigation facilities, and total income, were the significant predictors. It was therefore, concluded that the classical diffusion model might not be appropriate for explaining why farmers did or did not adopt the recommended technologies within the original Bida ADP. Other past studies have reported similar findings which showed that institutional constraints and technology-related variables are more important than classical

diffusion model variables such as human capital and farm-firm characteristics in predicting innovation adoption in third world countries (Shaw, 1987 and 1985; Oshuntogun, 1986).

Table 4. Multiple regression analysis of variables predictive of the proportion of total rice acreage covered by improved varieties

Predictor variables	Multiple R	Total R^2	Partial R^2 (%)	F-VALUE Prob.
Participation in FSR	29.27	0.2298	22.98	120.24***
Profitability of MV	12.00	0.3121	08.23	48.11***
Access to irrigation facilities	06.10	0.3365	02.44	14.72***
Age	-0.41	0.3580	02.15	13.41***
Member village Council	15.33	0.3854	2.74	17.78***
Availability of MV	07.73	0.3980	01.27	8.37**
Relative Advantage of MV	02.28	0.4239	02.59	17.85***
Yield advantage of MV	05.50	0.4334	00.95	6.64*
Maturity advantage of MV	03.86	0.4429	00.95	6.72**
Access to ag. radio program	-0.18	0.4543	01.14	8.22**
Distance from input depot	-0.48	0.4620	00.77	5.60*
Farm size	-1.75	0.4662	00.42	3.10^{NS}
Total income	00.68^{-3}	0.4735	00.73	5.41*
Distance from extension	00.34	0.4773	00.38	2.86^{NS}

*** =Significant at 0.001 level; ** =Significant at 0.01 level
* =Significant at 0.05 level; NS=Not significant at the .05 level

Educational Implications

1. The low predictive power of the classical diffusion model has educational implications. Most agricultural extension models being adopted in the LDCs, such as the Training and Visit model are predicated on the classical Transfer of Technology model. However, since the findings of this study and of other past studies have raised questions regarding the relevance of the classical diffusion model to resource-poor farming systems, it is suggested that new extension perspectives be developed. Such perspectives need to de-emphasize the prevalent individual-blame bias in current extension methodologies, paying greater attention to the need to reduce the institutional constraints with which farmers are confronted.
2. The findings of the study regarding the impact of FSR suggested that farmers' involvement in technology development has a positive impact on innovation adoption. Hence, it is recommended that rather than discard the FSR/E approach as it is being suggested in many quarters (Marcotte and swanson, 1987) a more productive approach would be to reevaluate the whole perspective in order to make it more responsive to the needs of resource-poor producers. Issues, such as strengthening the linkages among farmers, FSR, agricultural extension and other agricultural support services ought to attract

high priority. There is also a great need for the education of agricultural development practitioners in order to facilitate necessary institutional innovation needed for the implementation of truly participatory development.

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The World's Largest Extension System: Extension in China

Presented at
Assn. of International Agri. and Extension Education
1993 Annual Meeting
Arlington, Virginia

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THE WORLD'S LARGEST EXTENSION SYSTEM
EXTENSION IN CHINA

INTRODUCTION:

China has the largest extension system in the world but it is organized and managed very differently from the extension system in the United States. China has 300,000 employees working from the national through the township level in the crops division. Another 500,000, mostly part-time farmer technicians, are employed at the village level. Add to this, the employees of the livestock division and China has more than two-thirds of the extension employees worldwide. Extension programs are focused nearly exclusively on agriculture, although extension does get involved on the local level in social issues such as family planning.

Providing food, fuel and fiber for the country with the world's largest population is a daunting task. Chinese farmers who have only 7% of the world's arable land, feed 22% of the world's population. The extension system in China is charged with spreading new agricultural technologies to 850 million rural inhabitants. Heavy rains in the mountains are responsible for frequent floods causing widespread crop damage. Droughts are also a frequent occurrence in the fertile but dry northern China plain. Eighty percent of the Chinese population of 1.1 billion people live in the countryside, farming soils which have been tilled for over 4000 years. Last year, the number of people in China increased by the same amount as the total population of Australia (15 million) in spite of continued progress with the one child policy. Hunger and famine are well remembered by everyone over the age of 20. China's recent agricultural progress and accomplishment has been nothing short of incredible.

PURPOSE:

To give a brief explanatory overview of the history and present organization of the Extension Systems of the People's Republic of China.

METHODOLOGY:

The author was on special assignment to the Chinese Academy of Agricultural Sciences (CAAS) during six months in 1992. During this period he taught classes on the U.S. Agriculture Research and Extension Systems, gave numerous seminars and attended an International Extension Conference jointly sponsored by Food and Agriculture Organization (FAO) and the Chinese Ministry of Agriculture (MOA). From contacts he established with the World Bank, the Chinese - European Community Applied Technology Centre, FAO, CAAS and the MOA he developed a working understanding of the Chinese Extension Systems.

RESULTS AND CONCLUSIONS:

To begin to understand extension in China today, one must have an understanding of the history of the Chinese Extension system. Historians find evidence of experimental work on intensive cultivation in China as early the Han Dynasty (A.D. 25-200). The experimental results were disseminated to experienced farmers only after official approval was given. Later in the Song Dynasty (A.D. 960-1278), increasing population pressured officials to support agricultural research and technological innovation. During this time rice was promoted as a new crop for the arid north while wheat was introduced to the humid south. The term still used for "Extension" (tuiguang) was first used during this time (Delman, 1991).

During the Nationalist government era (1911-1949) a few private educational and missionary institutions undertook extension activities in the surrounding rural areas. Guangdong University set up an extension department modeled on the American experience, but the Nationalist government, in an effort to keep tight control on developments, organized the official extension service in the Ministry of Agriculture (MOA) rather than the Universities, where it would have had more independence. World War II, which started in China in 1937 with the Japanese invasion, slowed the meager accomplishments of forming a nationwide extension system (Delman, 1991).

After the revolution, the first agro-technological extension stations were established on an experimental basis in remote Northeast China in 1951. During the Great Leap Forward (1958-1961), an anti-bureaucratic mode swept the country including the extension system, with employees being sent out to the countryside to establish farm communes. All farmer managed land was removed from individual management and organized into large communal farms which would cover a township and have an average of 2000 workers. During this period, one-third of the local extension stations were closed. The extension system that emerged from this period was shattered and rather inefficient (Delman, 1991). During the Cultural Revolution (1966-1978), extension was essentially disbanded. Most of the extension stations were closed, extension employees were criticized, persecuted and many of them were forced to work as peasants in the countryside as a means of reeducation. Others changed their professions and took work in other disciplines (Zou,1992). The extension system, as well as much of the research and university system, essentially ceased to exist during this period.

Agricultural reform was brought about in 1978 with the return of control of the land to individual households. Extension faced the task of organizing a system that could provide agricultural information to 200 million households scattered across a vast and remote country. In 1982, the MOA undertook a review of the 150 County Agro-Technology Extension Centers (CATEC) and found that their experiences were positive. At this time, the government realized the need for national coordination of the Extension system and established the National Agro-Technology Extension Center (NATEC) in the MOA (Foo, 1992).

A goal was established to form extension organizations in every province, prefecture, county, township and village.

Today extension organizations are present at all levels of government. Figure 1, on the field crop division of Extension, gives some idea of the number of levels of government along with some of the branches. This represents six levels of government with extension bureaucracies at each level. The Extension organization has been described as an upside down pyramid, meaning that it is very top heavy. Only 38.9% of the extension employees are at the township level where they can have direct contact and carry out programs with the farmers (Yang, 1992). To date, 1300 CATEC have been established out of 2300 counties nationwide (Foo,1992). The CATEC serves a role that would be comparable to district or area extension centers in the United States. Because of the difficulty in communication and transportation, extension programming is focused on the township and village level. Currently, 38,000 Township Agro-Technology Extension Centers (TATEC) have been organized and 480,000 villages have extension staff. This accounts for extension coverage in 81% of the townships and 66% of the villages (Huang,1992). On average, each township technician is responsible for providing educational information to 3000 farm households (Yang,1992). Limited communication and transportation systems in rural areas creates many difficulties for extension staff in contacting large numbers of farmers.

The Animal Husbandry division of extension is an entirely separate organization from the crop division. They operate as though the other divisions do not exist. This adds to the inefficiency of the extension organization in China. The Animal Husbandry division maintains bureaucracies from the national level down to the village technician.

There are other extension organizations in China as well. Each of 1120 national, provincial and prefectural agricultural research institutes, will typically have a group of people whose role it is to disseminate research findings of that institute (FAO,1991). Some large state farms still exist, especially in northern China, and have their own separate extension personnel. The Communist Youth League, which is open to membership of youth 14-28 years of age, actively conducts training activities for members and non-members alike. The training focuses on appropriate technologies for sideline agriculture enterprises. The All-China Women's Federation (ACWF) likewise offers training to women on topics such as livestock raising (Delman.1991). This description of the Chinese Extension System helps clarify why many consider the extension organization in China to be very complex and difficult to understand.

The education levels of extension staff often limit effectiveness of the staff. Only 7.5% of the Extension employees have college degrees with an additional 17.5% holding two-year technical degrees. Fifty three percent have degrees at agricultural high schools and 22% have nine years of schooling. At the village level, where farmer interaction is most frequent, extension is usually represented by village leaders (i.e. party officials) and part-time farmer technicians. Most farmer technicians have 6-8 years of schooling but many are working on

certificates issued by the Agriculture Broadcasting School (FAO,1991). The Agriculture Broadcasting School offers educational programs via broadcast radio. Certificates are then granted to participants who pass a qualifying exam. Courses in agriculture extension subject matter have only been introduced at agricultural colleges since 1989 (Zhang,1992).

Ties between extension, research and educational institutions are weak to non-existent. Universities are linked to the Ministry of Education while extension and research are separate organizations within the MOA. The national research centers, which are part of the Chinese Academy of Sciences, as well as provincial and university research centers have little contact with extension personnel. Many CATEC conduct their own applied research projects. Communication is mostly vertical within each organization and then only with the levels immediately above and below. It is not uncommon to have several special applied research projects being conducted by different agencies within a county with little if any coordination between the research institutions or the local CATEC (FAO,1991).

Each level of government is responsible for funding the organizations at their own level. This results in considerable autonomy for each level of government. Bargaining is necessary between each of the levels to agree on the goals that will be accomplished at that level. These goals are formalized in the annual agreements signed by both parties. The agreements are very important in that with tasks from above, come resources to accomplish those goals. Much of the time of a bureaucrat, is spent on the bargaining that goes into the signing of an agreement between the levels of government immediately above and below his/her level.

Extension methods and subject matter in China has been centrally controlled. In the commune era, government leaders would decide on the agriculture technologies to be extended which would then be passed down to the commune and finally to the peasant farm worker for implementation. Since the household responsibility system was reintroduced, extension methods are less directive but still centrally controlled. Farmers do have the option to turn down new extension technologies; but, to obtain high quality seeds, fertilizer and other inputs at favorable prices, the farmers must sign a contract agreeing to use the recommended extension technology package. These extension contracts are considered highly successful and involve a written contract between the farmer and the extension organization. Extension agrees to provide certain inputs and services which may include plant protection, soil testing, fertilizer application and mechanized farm operations for a fee. A yield goal is agreed upon and extension will reimburse the farmer if the yield falls a certain percentage below the goal. If the yield exceeds the goal by a certain percentage, then extension receives 20% of the excess as a bonus (FAO,1991). Extension has strong incentives to provide the best supplies and services to their clients. The Chinese government is nearly frantic for continued progress to increase yields and meet the needs of an ever growing population.

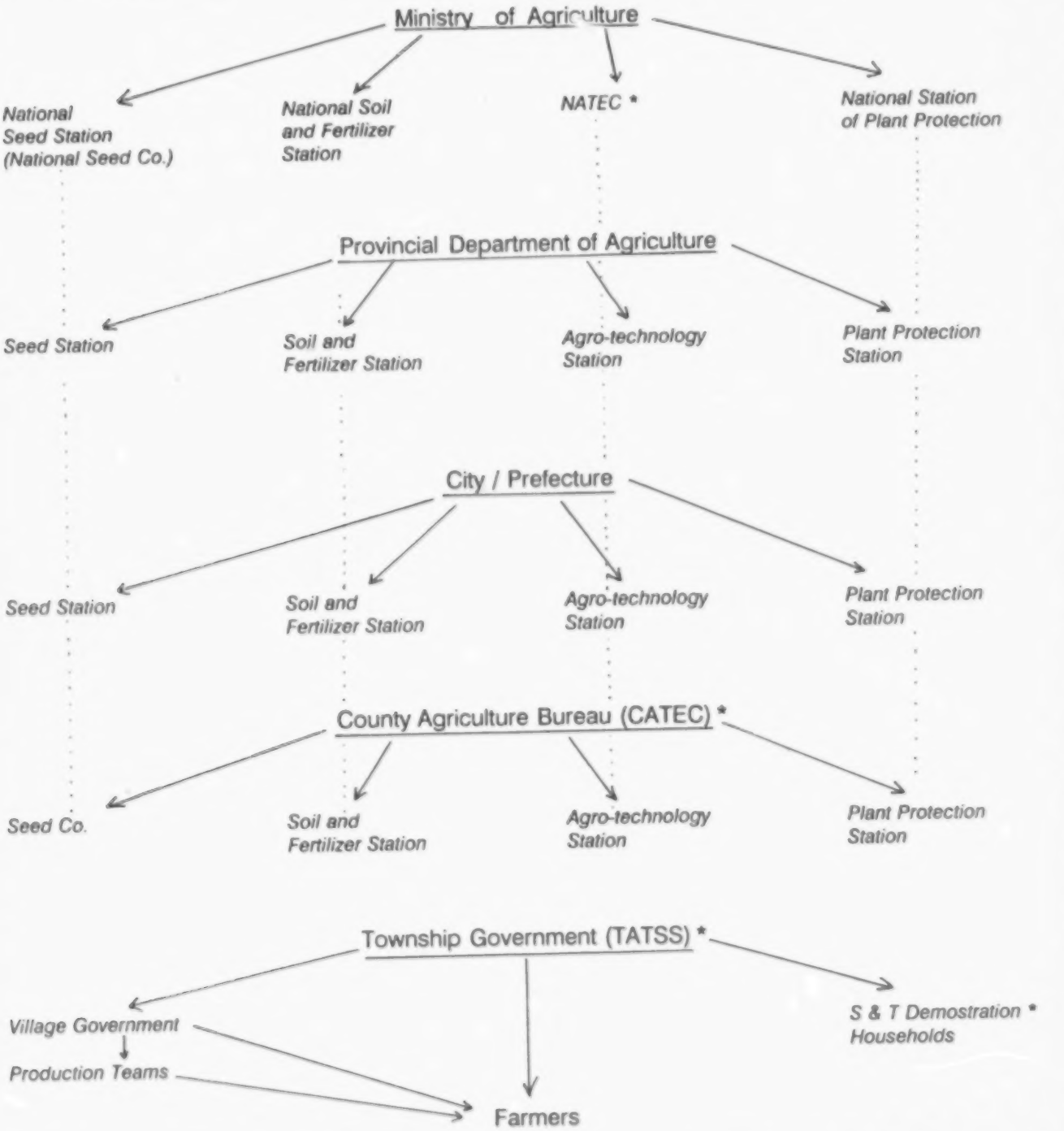
Demonstration households are widely discussed and held up as an extension method. Some 4.5 million demonstration households are utilized to demonstrate new technologies to village farmers (Delman,1991). Most CATECs and TATECs publish newsletters for farmers. Each village has a public broadcast system that Extension may use to announce meetings, pest outbreaks and other timely extension information. The village blackboard is another significant way used by farm technicians to inform villagers of important extension information. Radios are widely available in farm households and numbers of televisions are increasing in more prosperous farming areas and are being used increasingly to create farmer awareness of new technology (FAO,1991). Other Extension methods include "big character posters", exhibitions, extension printed materials, newspapers, cultural media such as songs and dance and finally "slogans" which have long been used to convey complex issues in short easy to remember phrases (Foo,1992).

Although Extension in China is very different from the United States system and it seems to have numerous inefficiencies, it is working. The national leaders of the Chinese Extension system are actively searching the world for ideas to speed reform of extension in China. The success of the Chinese Extension system and several good growing seasons, have given the agriculture leaders a new challenge; where to store the surplus of grain rather than rationing the traditional shortages.

EDUCATIONAL IMPORTANCE:

China continues to open it's doors to outside ideas. This will result in increased contact between Chinese Extension professionals and Western Extension professionals. To be effective in assisting the Chinese in reforming their extension systems, outside experts must understand the existing system.

Figure 1 Agriculture Extension Agencies under MOA involved in Field Crop Related Extension



* Legend: NATEC = National Agro-technology Extension Centre; CATEC = County Agro-technology Extension Centre; TATES = Township Agro-technology Extension Station; S&T = Science and Technology; Prefecture: a polictical subdivision between provinces and counties

from Delman, 1991

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Agricultural Extension Problems as Perceived by Extension Officers In Imo State of Nigeria

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INTRODUCTION

Agricultural extension services were established in Nigeria to provide farmers with information and resources necessary for the enhancement of their skills, businesses and welfare. However, the ability of the Nigerian extension service to assist farmers and contribute to agricultural development appears to have been limited by a variety of factors. This problem is not peculiar to Nigeria. According to Blanckengburg (1984), extension services in most developing countries have not responded adequately to the needs of small farmers and the complexities of their problems.

A number of studies (Radhakrishna and Bowen 1991, Sigman & Swanson, 1984; Allo & Schwass, 1982; Mosher, 1978; and Rogers, 1983) have identified constraints related to the following nine problem areas that limit the effectiveness of extension in Asia and Africa.

1. **Appropriate Technologies:** Technology involves the practical application of knowledge, tools, materials, and techniques to a given situation.(Sigman & Swanson, 1984). To be appropriate, technologies must be suitable to the needs of farmers and should enhance the use of local resources. Support systems for such technologies should be within the reach of a majority of farmers and easy to maintain.

2. **Linkage:** There is a considerable lag between research findings and their effective dissemination for adoption by the farming communities. Dynamic interaction between research and extension is necessary to facilitate flow of research findings and feedback between these organizations (Sigman and Swanson 1984, Allo & Schwass, 1982).

3. **Technical Training:**. Technical training and retraining is necessary for good extension work because traditional methods of imparting knowledge, changing attitudes and solving problems do not always work (Rao & Hanumanthappa, 1985). Technical training of extension staff has received greater recognition with the introduction of the Training and Visit System (T&V) in more than 65 countries since the late 1970s (Miller and Maung,1990).

4. **Extension Training:** Sigman and Swanson (1984) noted the need for extension staff to have theoretical knowledge of the communication process as well as practical experience in using different methods and techniques. Extension methods and communication skills are the "educational tools" of extension personnel (Sigman & Swanson, 1984). Extension methods are the means through which agricultural innovations and practices are diffused to rural clientele (Smith, 1978). Extension approaches in Africa tend to have considerable local involvement, use group orientation methods, and visual media (Biggelaar and Suvedi 1990).

5. **Mobility:** Mobility is a major problem in extension education (Axinn & Thorat, 1972, Blanckenburg, 1984). Vehicles are critical to Extension's effectiveness. They facilitate extension officers field work and contact with farmers. Rogers (1983) noted that extension's effectiveness is directly related to the number of contacts that extension workers make with their clients.

6. **Equipment:** Communication systems and teaching equipment are critical to extension delivery systems. However, literature indicate that few extension services in developing countries can afford to supply every officer with equipment such as cameras, tape recorders, slide projectors, and other visual aids (Allo & Schwass, 1982).

7. **Teaching Aids:** Teaching aids and materials are the "software" needed to support the teaching-learning process (Sigman & Swanson, 1984). Printed material (bulletins, brochures, posters, leaflets etc.) and audio visual equipment are examples of teaching aids. Teaching aids and materials should be simple, easy to understand, inexpensive, interesting and adaptable to local situations.

8. **Organization:** A major problem related to extension organization is the use of extension personnel for non-extension activities. Extension workers are frequently asked to perform duties such as collecting census data, collecting rural credit debts, "selling" a rural credit savings plan, and providing direct services rather than education (Sigman & Swanson, 1984). These duties distract officers from extension work, and reduce their credibility with farmers.

9. **Coordination:** Coordination unifies and synchronizes the activities of different agencies towards a common goal (Veerabhadraiah & Ashok Kumar, 1985). The agricultural extension service involves a variety of relationships with research, training, education and other institutions. Extension needs to work in close liaison with various departments and ministries to effectively implement agricultural and rural development programs.

PURPOSE

The purpose of this study was to examine the perceptions of extension officers regarding problems facing agricultural extension in Imo state, Nigeria. Specific objectives of the study were to:

1. Determine the seriousness of extension problems as perceived by extension officers.
2. Rank the seriousness of the extension problems in order of importance.
3. Determine relationships between extension officers' perceptions about extension problems and their demographic characteristics.

METHODS AND PROCEDURES

This study utilized a descriptive survey research methodology. The population for the study was a census of all extension officers employed in three extension zones (Owerri, Okigwe and Urlu) in Imo state, Nigeria. The questionnaire developed by Radhakrishna and Bowen (1991) was modified and utilized for this study. Face and content validity were established using a panel of experts comprised of three agricultural and extension education faculty members at the Pennsylvania State University. Further, The questionnaire was

validated by the Chief Technical Officer, in charge of Imo State Extension Services. The Instrument consisted of three parts. Part one contained 39 items related to seriousness of extension problems measured on a three point, Likert-type scale ranging from "1= not a problem" to" 3= a serious problem. " Part two involved rank ordering of the seriousness of problems in order of importance, and part three gathered demographic information such as age gender, education level marital status and experience. The data were analyzed using descriptive statistics. Data were collected during spring 1992. After three months a total of 43 extension officers responded (43% return). A "post hoc" reliability analysis indicated that the questionnaire had acceptable reliability (Cronbach's alpha=.85)

RESULTS AND CONCLUSIONS

Extension Officers were asked to indicate their perceptions of problems facing extension in Imo State, Nigeria (table 1)

Table 1 Extension Officer's Perceptions of Extension Problems

Extension Problems	Summated mean	SD	Mean	SD	Rank Seriousness
Equipment	10.05	2.10	2.51	0.52	1
Teaching Aids	2.32	0.75	2.32	0.75	2
Coordination	6.71	1.47	2.24	0.49	3
Mobility	10.90	1.78	2.18	0.36	4
Technology	13.00	2.21	2.17	0.37	5
Organization	9.65	2.05	1.93	0.41	6
Extension Training	5.73	1.50	1.91	0.50	7
Technical Training	9.37	2.17	1.87	0.43	8
Linkage	12.00	3.39	1.71	0.48	9

1=not a problem, 2=somewhat a problem, 3=a serious problem

The extension officers perceived five of the nine problem areas to be "*somewhat a problem*". Equipment was rated as the highest problem with a mean (of 2.51) that falls above the midpoint between "*somewhat a problem*" and "*serious problem*". Teaching aids, coordination, mobility and technology were also rated as "*somewhat a problem*"

Extension officers were asked to rank the nine problems areas which they perceived as problems in order of importance. Mobility, Equipment and Teaching Aids were ranked as the first, second and third most serious problems respectively. There were differences in what the extension officers perceived as serious problems and how they ranked the seriousness of problems in order of importance. For example, equipment was rated as the most serious problem. However, in order of importance it was ranked second. Similar variations were observed with respect to other problem areas (Table 2).

Table 2. Seriousness of Extension Problems Ranked in order of Importance by Extension Officers

Extension Problems	f	mean ranking	SD	Ranking of Importance
Mobility	20	1.95	2.01	1
equipment	20	2.80	2.26	2
Teaching Aids	20	3.20	2.33	3
Organization	20	4.75	3.32	4
Linkage	20	5.00	2.63	5
Technology	20	5.00	2.63	6
Tech. Training	20	5.20	2.37	7
Coordination	20	5.40	3.10	8
Ext. Training	20	5,45	3.50	9

Correlation coefficients were computed to determine what relationship (if any) existed between the extension officers' demographics and their perceptions about extension problems (Table 3).

Table 3. Relationships -Correlation Coefficients- Between Extension Officers Demographics and Their Perceptions of Extension Problems.

Extension Problems	Age	Gender	Marital status	Exp.	Educ.
Mobility	.23	-.09	.22	.15	.23
Equipment	-.13	.01	.02	.09	-.00
Teaching Aid	-.24	-.06	-.22	-.13	.10
Organization	.04	-.35	.17	.03	-.02
Linkage	.27	-.54**	.26	.10	.02
Technology	-.09	.09	-.52**	-.25	.18
Tech. training	.12	-.56**	.43**	.30	.03
Coordination	.38*	-.52**	.57**	.34*	-.04
Ext. Training	.21	-.46**	.10	.24	.03

* Significant at .05, ** Significant at .001.

There was a direct relationship between respondents' age and their perception regarding coordination (r=.38,p<.05). A similar relationship was observed between work experience and coordination (r=.34,p<.05). Conversely, the study revealed an inverse relationship between marriage and respondents perception of technology as a problem (r=.51, p<.00). Marriage was positively related to perceived problems of technical training and coordination (r=.43,p<.001 & r= 57,p<.001 respectively). Additionally, the extension officers' perceptions regarding technology, linkage technical training, organization and coordination were related to their gender. Male extension officers perceived these things to be more of a problem than their female counterparts. No significant relationship was found between respondents level of education and their perceptions regarding the nine problem areas.

The findings of this study support existing knowledge with regard to problems facing extension personnel. But the respondents of Imo State gave relatively less emphasis on

technology and linkage problems than were indicated in other studies. Similar findings about moderate emphasis on linkage and technology problems were reported by Radhakrishna and Bowen (1991),and Sigman and Swanson (1984).

EDUCATIONAL IMPORTANCE

The following suggestions are made based on the findings of this study. First, this study revealed that lack of transportation is a critical problem facing extension in Imo State of Nigeria. Therefore, Imo State government should increase their funding for extension to purchase and maintain more vehicles. In the past, the government gave extension officers loans to purchase their private vehicles which they used (in addition to government vehicles) for extension work. This practice should continue. Extension officers should also be give extra funding to cover cost of fuel and vehicle maintenance. This is necessary since extension personnel tend to depend on farm and home visits for transfer of information and technology. Further, Imo State extension should increase their use of mass media and group contact methods to reach farmers efficiently.

Second, the extension officers in this study perceived coordination to be a serious problem with Imo State extension. Therefore, concerted efforts should be made to improve coordination between extension and other agencies. Systematic planning, effective communication, and Cooperative programming would help extension overcome this problem.

Third, the finding indicate that Imo State extension officers lack essential equipment. Therefore, extension personnel should be provided with teaching and communication equipment necessary for conducting quality work. With adequate teaching and communication equipment, extension officers can use group methods more often to reach their clients efficiently. This may reduce their level of travel and lessen the mobility problem.

In summary, this study identified several constraints that are perceived to limit the effectiveness of extension in Imo State of Nigeria. The respondents indicated that transportation, equipment, and teaching aids were the most critical problems. To alleviate these constraints, extension officers should be trained to 1) develop necessary equipment and teaching aids using local and readily available resources, and 2) deliver extension programs using innovative approaches. In addition, extension officers should be provided with adequate transportation equipment, and teaching aids to do extension work effectively.

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Session D

CENTRAL AND EASTERN EUROPE ISSUES

Paper #1. **AN ASSESSMENT OF MOTIVATIONAL FACTORS AFFECTING CENTRAL AND EASTERN EUROPEAN STUDENTS PARTICIPATION IN PRACTICAL AGRICULTURAL EXCHANGE PROGRAMS**
by
Stephen P. Jones
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Paper #2. **ATTITUDINAL BARRIERS TO IMPLEMENTING TECHNOLOGICAL CHANGE IN AGRICULTURE IN THE FORMER SOVIET UNION**
by
Amy McDonald
Texas A&M University

Paper #3. **WORKING TOGETHER: ALTERNATIVE APPROACHES TO TECHNOLOGY DEVELOPMENT AND ADOPTION IN AGRICULTURE**
by
David G. Acker and Larry S. Lev
Oregon State University

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An Assessment of Motivational Factors Affecting Central and Eastern European Students Participation in Practical Agricultural Exchange Programs

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An Assessment of Motivational Factors Affecting Central and Eastern European Students Participation in Practical Agricultural Exchange Programs

INTRODUCTION

The changing political situation throughout Central and Eastern Europe* has created an interest on the part of young adult agriculturalists from this part of the world to compare and explore agricultural production systems used in the United States. For the past fifty to seventy years farmers in Central and Eastern Europe have been working with collective or state farm systems. As these countries move toward the privatization of agriculture and farm land is returned to individual producers, young people interested in farming need to understand the management and practical/technical skills necessary to be successful producers in their home countries (U.S. Department of State, 1990; Herrin, 1991).

Practical agricultural exchange programs offer an opportunity for these young farmers to work with American producers to understand the many factors involved in American agricultural systems. Several organizations familiar to the Association for International Agricultural Education and Extension (AIAEE) membership have provided leadership in establishing relationships with agricultural institutions in Central and Eastern Europe. These organizations include the Minnesota Agricultural Student Trainee (MAST) program - University of Minnesota, the Ohio State Agricultural Intern Program - Ohio State University, and the Work Experience Abroad Program - National FFA Organization. A typical program provides six to eight months of practical experience living and working with a farm or ranch family and in the case of MAST a three month academic program. These and other organizations have responded to the "... increased demand for practical agricultural exchanges in many emerging democracies" (Herrin, 1991, p. 13).

* For purposes of this study, the Central and Eastern European countries include Hungary, Czechoslovakia, Poland, Romania, Bulgaria, Estonia, Lithuania, Ukraine, and Russia.

However, there is a perception among the exchange community that participants from Central and Eastern Europe have a set of reasons and needs for wanting to gain practical agricultural experiences in the United States that are different from participants from the traditional countries* exchange organizations have worked with in the past (U.S. Department of State, 1990). The perception represents a challenge for agricultural exchange organizations and host families interested in establishing stronger relationships with Central and Eastern European countries.

PURPOSE AND OBJECTIVES

Can the perception be changed? Why do young farmers from Central and Eastern Europe want to be involved in agricultural exchange programs? Are the participants from Central and Eastern Europe different from participants from the traditional countries involved in agricultural exchange programs? It is the purpose of this study to examine the reasons why people participate in practical agricultural exchange programs. Such information can then be used to help agricultural exchange organizations and specific host families better understand Central and Eastern European involvement and maximize their experiences.

The specific objectives of the study were to;

1) Determine if differences exist in the personal characteristics profile of participants from Central and Eastern Europe and traditional countries involved in exchange programs.
2) Determine sources of their original motivation for involvement in agricultural exchange programs.

THEORETICAL FRAMEWORK

Motivation provided the theoretical base for this research "... because it aids in the understanding of why people behave the ways they do ..."(West and Foster, 1976, p. 91). The specific theoretical framework used in the study was developed from the humanistic perspective of motivational psychology. The theoretical framework has been directly

* These traditional countries include most of northern and western Europe, Australia, and New Zealand

applied to the objectives in the research study. In terms of personal characteristics, the humanists argue that behavior tends to be determined, partially, by one or more of the person's personal characteristic traits. The second objective of the study was to determine sources of original motivation for participant involvement in agricultural exchange programs. By studying the conscious experience of individuals, humanists believe that it is possible to assess origin of motivational factors which influence behavior (Arkes and Garske, 1977). Deci (1975) argues that most behaivor is motivated by both intrinsic and extrinsic factors. The sources of motivation used in this study were identified on a basis of their intrinsic or extrinsic origin.

METHODOLOGY

A population of 188 agricultural exchange students from 30 countries participating in the 1991 and 1992 Minnesota Agricultural Student Trainee (MAST) program at the University of Minnesota were surveyed. Each of these students had recently completed their practical agricultural training program requirement before attending classes at the College of Agriculture, University of Minnesota. All members of this population were represented in the sample. Items included in the instrument were directly linked to the theoretical framework on motivation as advocated by the humanistic school of thought. Several demographic questions were asked to ascertain certain aspects of this group's background. The second part of the instrument consisted of twenty-five personal characteristic traits. Each of these characteristics was matched with a bi-polar adjective. Using a modified semantic differential 7-point scale, students were asked to identify how closely they identified with the desired characteristics. Five-pont Likert-type scales were developed to measure the level of importance of 14 possible sources of motivation for involvement in practical agricultural exchange programs. A total of 151 students did respond to the survey for a 80.32 percent response rate. Of the 151 respondents, 37 were students representing the Eastern and Central European countries of Poland, Hungary, Czechoslovakia, Ukraine, Lithuania, Estonia, Bulgaria, Romania, and Russia. The remaining 114 respondents represented countries traditional to agricultural exchange programs - primarily western and northern European countries, Australia, and New Zealand.

RESULTS

Personal characteristics profile

How did these students rate themselves on the list of 25 personal characteristic traits identified in the literature as being important for people involved in international agricultural activities? As indicated in Table 1 and Table 2, respondents from the two groups did have some differences in how closely they identified with the desired characteristic traits. The ranking of the characteristic traits indicate that students from the countries traditional to agricultural exchange programs identified more closely with persistent and curiosity traits. The ranking also indicates students from Central and Eastern Europe identified more closely with the objective and altruistic traits. There were statistically significant differences in the adventurous, cosmopolitan, team player, altruistic, and non-judgmental characteristic traits (results of T-tests at a .05 significance level). These findings indicate that the respondents from Eastern and Central Europe and those from the traditional countries did rate themselves differently on seven of the 25 personal characteristic traits.

Sources of original motivation

Why did these students initially become involved in an international practical agricultural experience? Out of the 14 listed sources of original motivation, Table 3 and Table 4 indicate that those sources given the most importance had to do with a combination of intrinsic and extrinsic factors. The ranking of the sources of original motivation indicates similar reasons as to why students from Central and Eastern Europe and those from countries traditional to practical agricultural exchange programs chose to participate in a practical agricultural exchange program. There were, however, some differences in the ranking of original sources of motivation. The top five sources of original motivation indicate that both groups expected to gain a broader view of the world and to gain experiences that would help them learn new skills and to assist in future jobs. There were statistically significant differences in the required practical and curiosity sources of original motivation (results of T-tests at a .05 significance level). These findings indicate that a combination of intrinsic and extrinsic factors have played a contributing role for international students to gain a practical agricultural experience.

CONCLUSION

The results from this current study do indicate that some differences exist in the personality characteristic traits and sources of original motivation between respondents from the traditional countries and respondents from the Central and Eastern European countries. However, findings from this study also indicate many similiarities in the personality characteristic traits and in the sources of original motivation between students from the traditional countries and students from Central and Eastern Europe. The practical importance of the differences was not significant (Hinkle, 1979).

The study also indicates a need to do additional research in exploring possible differences in the technical agriculture experiences between the two groups and follow up studies on how participants value and use their international experiences once they return to their home countries.

EDUCATIONAL IMPORTANCE

The many political, economic, and social changes taking place throughout Central and Eastern Europe at this time reflect significant changes in how the future of production agriculture will evolve in that part of the world. For example, Estonian families whose private farms were incorporated into the state or collective farms during the 1940's are now regaining control of family land. Similar situations are taking place in Czechoslóvakia, Hungary, and Poland. In the St. Petersburg area of Russia, state farms are being broken into smaller units and private farmers are being given the opportunity to start their own farms. The educational opportunity is to develop young farmers in these countries to gain and understand the technical skills and management know-how to be successful producers in their own countries. Practical agricultural exchange programs in the United States have provided leadership in reaching people from these countries and can provide structured "learning by doing" experiences on farms and ranches of selected producers who can teach the necessary skills to Central and Eastern European farmers. The educational importance of this study is to better understand the motivation and personalities of these people to help maximize their experiences in the United States. Learning and teaching strategies can then be developed to make their experiences and the experiences of their host families in the exchanges more positive.

Table 1: Identification of respondents from traditional countries with characteristics desired by people involved in international agricultural experiences.

Desired characteristic	N	Mean[a]	Rank
Respectful	114	5.947	1
Social	114	5.851	2
Optimistic	113	5.681	3
Flexible	113	5.664	4
Diplomatic	114	5.535	5
Tolerant	114	5.491	6
Enthusiastic	113	5.460	7
Sense of humor	114	5.316	8
Persistent	111	5.306	9
Curious	113	5.239	10

Table 2: Identification of Central and Eastern European respondents with characteristics desired by people involved in international agricultural experiences.

Desired characteristic	N	Mean	Rank
Social	37	6.081	1
Respectful	37	6.054	2
Optimistic	37	5.946	3
Tolerant	37	5.838	4
Flexible	37	5.757	5
Enthusiastic	37	5.649	6
Sense of Humor	36	5.583	7
Diplomatic	37	5.541	8
Objective	37	5.405	9
Altruistic	36	5.278	10

a Means established from a 1-7 scale.

Table 3: Frequencies, means, and rank by means of sources of original motivation for involvement in international agricultural activities - (traditional countries).

Source	N	Mean[b]	Rank
Expand experiences	116	4.664	1
Curiosity	115	4.661	2
Broader view point	115	4.552	3
Add to professional competence	115	4.339	4
Help in getting a future job	113	3.920	5

Table 4: Frequencies, means, and rank by means of sources of original motivation for involvement in international agricultural activities - (Central and Eastern Europe).

Source	N	Mean	Rank
Expand experiences	36	4.611	1
Broader view point	37	4.595	2
Add to professional competence	36	4.500	3
Curiosity	36	4.361	4
Help in getting a future job	36	4.194	5

b Means established from a 1-5 scale.

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Attitudinal Barriers to Implementing Technological Change in Agriculture in the Former Soviet Union

—You Can Bring Your Luggage, But Leave The Baggage At Home—

by

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Introduction

Although the organization of Soviet agriculture has remained collective since the early 1930s, many changes have occurred. Initially, all production from a collective farm was seized by the state, and peasant workers had to survive as best they could by eating what they produced for their own use. The workers were able to use tiny private plots outside the collective farm to raise food for themselves.

The size of collective farms has gradually increased during the past 60 years, due to smaller collective and state farms combining to form larger ones. According to one source, the nearly 50,000 collective and state farms today contain an average of more than 4,500 hectares (11,115 acres) of cropland and an additional amount of pastureland. Approximately 400 workers are allocated to each farm (Prosterman, 1991).

In the mid-1960s, the state government began to pour money into the collective and state farms in an attempt to increase production. Although this process has continued until today, no marked production increases have occurred (Prosterman, 1991).

While governmental sources have provided large amounts of funding in an effort to increase productivity of collectives (referring to both collective farms and state farms), statistics show the money has been ineffective. When compared with the United States, "for the same amount of land, material inputs and labor, Soviet farms produce less than half as much as North American farms in similar climatic areas" (Prosterman, 1991, p. 7). However, the citizens of the former Soviet Union are capable of producing efficiently, because the roughly 3% of the cultivated land in the former Soviet Union that is occupied by private farm plots produces 25-30% of the total value of agricultural production (Prosterman, 1991).

The Republic of Russia contains 39% of the agricultural households and 57% of the cultivated land in the former Soviet Union. Three laws have been passed in Russia allowing for the acceleration of the Russian land-reform process. These laws have exempted individual peasant farms from state procurement, exempted peasant farms from land taxes for five years, allowed peasant farms to use hired labor, and provided for maximum landholding ceilings (Prosterman, 1991).

The growth of independent farming is an attractive option for the former Soviet Union for several reasons. Evidence indicates that individual farms achieve greater total sector productivity than collective or state farms. In other words, the smaller farms get more output for every ruble of imports, land, material inputs and labor than collective or state farms (Prosterman, 1991).

When farms are individualized, citizens gain empowerment. The grassroots level is where the choices and decision-making are made. This democracy at the grassroots level differs from the hierarchical style and centralization of power that exist in a typical collective or state farm. "The principal reason for establishing peasant farms was to escape workplaces where they [the farmers] only responded to orders, and to realize some economic independence" (Prosterman, 1991, p. 9).

One goal of the former Soviet Union is to create a market economy, and the establishment of individual farms will complement and support these efforts. A group of privatized farmers can create effective demands for new sources of supply for inputs and for new channels for marketing, storage, processing and distribution (Prosterman, 1991).

One problem with past harvests in the former Soviet Union has been that of distribution. Although crops may have been large and harvest abundant, hunger and an imbalance of nutrition still occurred in urban areas due to the lack of distribution channels for transporting food crops to the people. The lack of profit incentive also contributed to the poor food supply for urban residents. Food supplies often rotted in the fields or in storage. Individual farms will help reduce the on-farm and post-harvest losses that currently characterize the collective sector, because the individualized farms are more likely to ensure efficient harvesting, storage and transportation of the crops that are produced.

Purpose

To help individual farmers, Russian officials have begun to turn to change agents from other countries, especially those in the West, for assistance. People in this audience are likely

to be called upon to recommend others or to serve themselves as such change agents. Consequently, the purpose of the presentation will be two fold. One is to summarize what we know about privatization and attitudes of Russian farmers. The second is to acquaint or to remind the audience of some of the natural psychological and sociological prejudices that change agents will carry into any developmental activity in the former Soviet Union. Commonly labeled as ethnocentric baggage, these natural prejudices are not curable—but by raising the awareness level in potential change agents, chances for success in developmental efforts are increased. In this presentation, the author hopes to increase the audience's awareness of key aspects or factors pertinent to successful development in the former Soviet Union. These factors will affect Russian farmers, especially European Russians, and western change agents.

Methodology

The points made in this paper have been obtained from a review of the literature and personal interviews, including an interview with a change agent presently engaged in a development activity in Russia. What has been striking has been the lack of objective information, at least in English, about attitudes held by Russian farmers about risk-taking, innovativeness, and attitudes toward change agents.

Results

Because it is necessary for the Russians (referring specifically to the citizens of the Russian Republic) to ensure a plentiful food supply for the long winter months, it is important to initiate change. However, any change must be accepted by the people involved, and they must be satisfied with the actions taken. Unhappy citizens could lead to rebellion, and to a desire to have things the "way they were." In other words, hungry people might take measures to return the former Soviet Union to its previous communistic or totalitarian state (McCrady, 1992).

A plentiful food supply must be established, and because private farmers have proved their ability to produce, one of the first tasks will be to enable agrarian citizens to enter private farming if they so desire. Then, private farmers must have help. The farmers will need equipment, money from lending institutions, and productive land. Then, a marketing and distribution system for the privatized farmers must be implemented. This paper will address preliminary problems encountered when people serving as change agents attempt to initiate change by assisting newly-privatized farmers.

As the individual republics of the former Soviet Union move toward a free-market society based on democracy, privatization of land will continue to be a major stepping-stone to individual freedom. However, American change agents must recognize the unique characteristics of Russian agrarian society, such as the history, culture and values of the citizens involved, before attempting to initiate change.

Privatization in Russia marks the beginning of technological development. Technological development is much more than the overt acceptance of material and technical improvements; it is a cultural, social, and psychological process as well. Associated with every technical and material change is a corresponding change in the attitudes, thoughts, values, beliefs, and behaviors of the people who are affected by the material change (Foster, 1973). It is necessary to consider what citizens of agrarian Russia want before implementing technological development.

So what do the Russians want? Many Russian peasants do not want to enter privatized farming. "Only a small proportion of respondents thought their neighbors were positive about cooperatives, 11.4%, and only one third of the people surveyed would be interested in participating in cooperatives' activity themselves" (Nelson, 1992, p). There are four primary reasons for this reluctance.

The first reason for reluctance to enter privatization is grounded in the history of the Russian peasants. The last time Russian peasants were able to farm individual parcels and

function in a market was 1917 to 1929. During this time, however, the Soviet state continued to own the land. In the late 1920s, Stalin ousted millions of the more successful farmers, or "kulaks," from the land they farmed and sent them to Siberia. These "kulaks" included anyone who farmed more than 30 hectares of land, had more than three cows, ran a small shop, or hired any labor. In short, the kulaks were the farmers who had worked to improve their farms and had proven themselves to be successful. Following the dekulakization process, forced collectivization began in earnest (Prosterman, 1991).

"Dekulakization" and forced collectivization occurred for a "combination of reasons, including the desire for state control over the distribution and use of agricultural production and concern for political control of the peasantry" (Prosterman, 1991). After Stalin's actions, production fell drastically. As a result, Stalin briefly discontinued decollectivization, causing farmers to leave the new collectives. Stalin then reasserted the policy, but the disruption in the agricultural production proved disastrous for the country. The resulting famine left more than 5 million people dead (Prosterman, 1991).

Russian agriculturalists remember what their elders have told them of the dekulakization process, and they are unwilling to risk leaving the collectives if the government will not allow them to stay in privatized farming. Thus, it seems reasonable to expect that many farmers are waiting to see how stable the new government is before they take chances. In addition, history has shown that those farmers who did well, the kulaks, were only punished for their success. Why should the Russians take that chance? Why should Russians listen to change agents who encourage such activity?

The cultural background of the agrarian citizens is the second reason they do not want to enter privatization. Psychologically, it is difficult for people in rural areas to take chances to initiate change in their lifestyle. This premise is supported by years of sociological research, as indicated by Foster in 1973.

> The peasant is virtually powerless with respect to large areas of his life, because the basic decisions affecting him are made by members of other classes. Political activity is truncated, because major control is exercised from national or provincial centers. Economically, the peasant is dependent on forces that operate well beyond his local boundaries, and only under special circumstances are prices for his production set by village factors. There is not even local autonomy in religion. ... in other words, the peasant expects to obey, not to command. He can plead, implore, propitiate, and hope for a miracle, but in neither case can he expect by his own action, to have any effective control (Foster, 1973, p. 31).

In addition, Dr. Vera A. Matusevich of the Academy of the Economy of the USSR, a prominent Russian expert on issues of cooperative agriculture, agrees that attitude will be one barrier to technological change. During a leadership forum on "The Future of Soviet Agriculture" in October 1991 at Virginia Polytechnic Institute and State University, Matusevich said that not everyone will want to be private farmers if given the chance. "What will you do with the rest, millions of people who can't work on their own? Some of them would like to try, but they simply have never tried to work without commands, orders. They don't know what private farming or risk means. Besides, there is no market infrastructure in the Soviet Union, and it is difficult to market agricultural products and to buy input. So some of the peasants are not only afraid but even hate the new system; they are accustomed to be under the roof of collective or state farms" (Yeatts, 1991).

Not only must the change agent understand the natural reluctance by the Russian agriculturalist to accept change, but the change agent must also understand the influence of community—a third reason peasants do not support privatization. The opinion of members of the community can greatly affect whether someone is willing to try something new, even if the something new means a more comfortable or luxurious lifestyle.

> The successful person invites the suspicion, the enmity, the gossip, the character assassination, and perhaps the witchcraft and physical attacks of his fellows. Any evidence of a change for the better in his situation is proof of guilt—it is all that is needed to show that, in some fashion, he has taken advantage of his neighbors. The villagers not unnaturally react in the most effective way known to them to discourage

> a neighbor from tampering with the traditional division of the pie. The force of public opinion in peasant society, through its very bitterness and mercilessness, is thus seen as a functional device whereby families protect themselves from economic and other loss through the real or imagined chicanery and dishonesty of their friends. This focus also explains why peasant families usually attempt to conceal their economic improvements. Visible evidence of fortune will be interpreted as open confession of guilt, and the lucky or hardworking family will be subject to slander and gossip and perhaps economic blackmail as a consequence (Foster, 1973, p. 36).

Consequently, jealousy is an important aspect of community member's reactions to some farmers going private. However, according to Timothy M. Hanstad, the deputy executive director of the Rural Development Institute, jealousy decreases as more individual farmers appear in an area and it becomes more common to see them. Kenneth R. Gray, chief of the centrally-planned economics branch of the Agriculture and Trade Analysis Division of the Economic Research Service of the U.S. Department of Agriculture, agrees. Gray, who edits *Soviet Agriculture—Comparative Perspectives*, said "In regions where there are now a large number of independent farmers to support each other, it [jealousy] is now passing" (Yeatts, 1992, p. 11).

A fourth and powerful reason many people may be afraid to change to privatization is fear of the lack of security which privatization represents. Under the previous collective system, citizens were promised retirement benefits and pensions for old age; they were promised medical care; and they were promised food and shelter. For them, change represents a gamble—and it is a gamble many of them would rather not take.

> Many of the people are concerned that the new system is taking the security that they have had for a lifetime and replacing it with conditions that they have been told all of their life they would never have to face. Under the communist system everyone was guaranteed a job and an income. Prices were stable due to heavy government subsidies with the public told that they should expect future prices to be even lower. Almost all personal needs were being supplied by the government. Under the new system, people are facing the possibility of having to pay for services that were previously free or very cheap, such as medical services, schooling, transportation, basic public services and in some cases even food and housing. Coupled with these changes, they are facing the possibility of unemployment, inflation, shortages of goods in stores, shortages in housing, shortages in fuel supplies, shortages of food and a rapidly expanding criminal element that is highly mobile, well organized and ruthless" (Taylor et al., 1993, p.5).

Although it is hoped no American change agent would be so short-sighted as to insist on plunging directly into promoting privatization in Russia without some regard to the desires of the agrarian society, some U.S. experts believe that waiting too long for privatization will be a mistake. Dimitri K. Simes, a Senior Associate of the Carnegie Endowment for International Peace, promotes immediate action by the United States. Simes emphatically states his belief that the United States will have to intervene in the former Soviet Union to initiate change and maintain Russian democracy.

> Of course, the ultimate outcome of the historical drama unfolding in the former Soviet Union will not be determined by foreigners. There is the real possibility that, no matter what the West does, democracy in these lands will prove only a brief interlude. But there is the virtual certainty that without a major constructive engagement by the West—and realistically, this can only be arranged by the United States—the Russian democratic experiment will go up in smoke, taking the rest of the region with it (Simes, 1992, p.89).

And some Russians desperately want privatization. "...A general acceptance and legalization of the rights of a person to acquire private property must be backed in our

country by changes in mass consciousness that would ensure not only the defense of this right but also respect for anyone who stands up for it and for the efforts of such persons if they are expended in conformity with the laws and moral norms accepted in a modern civilized society" (Zamoshkin, 1992, p. 74).

Evegeny A. Knyazev, Head of the International Department of Kazan State University, agrees. Although the former Soviet Union is behind in many aspects of science, he is convinced now is the time to initiate change. "This time we have to change. This time it is all important" (Knyasev, 1992).

In addition to the four characteristics of Russians when faced with change, the outlook of Americans must be considered. This outlook bears directly on the purpose of this paper because there exists an interlocking relationship between the baggage carried by both parties involved in a change process. As Americans strive to implement change in the former Soviet Union, they will arrive with the best of intentions, a supply of enthusiasm, and a host of something they preferably would have left behind—cultural biases, or baggage. Cultural biases are "settled, often unconscious and sometimes prejudiced outlooks which reflect a person's particular societal and cultural background" (Christiansen, 1993). Americans carry with them throughout their life expectations and values, all of which are derived from a combination of their previous experiences, cultural values, childhood, and personal relationships.

Some of these cultural biases will run counter to values of Russian agriculturists. For example, middle-class Americans, in general, tend to criticize freely those in authority, although they generally react strongly to foreigners criticizing those same authority figures (Christiansen, 1993). Russians, on the other hand, have never had the luxury of openly criticising their authority figures. What American change agents may view as a candid assessment of their leader's performance, a Russian might consider risky.

If an American is in a position of authority over a Russian, the American should not expect the Russian openly to find fault with his or her actions. Russians, through a long history of acceptance of orders, will likely not provide the valuable input to keep a project going without special effort by the change agent to solicit advice. "Orders are received from a higher authority and carried out without question. This appears to stifle the creativity of subordinates and requires an inordinate amount of effort to assure blame will be placed somewhere else in case something goes wrong" (Taylor et. al., 1993, p. 4).

Middle class Americans place a high value on change, often at the sacrifice of the traditional. In addition, Americans place a high value on economic gain. The "work ethic" is often espoused as being "the American way of life." In other words, the harder you work, the more money you will make, and that should be the ultimate goal, the gauge for success. The idea of working harder or longer to achieve more is foreign to Russians. They have worked so long under the socialist system that they do not see a correlation between personal input and reward. It will be natural for the American change agent to interpret the Russian's lack of motivation as laziness, and a natural resentment could occur. Therefore, by realizing prior to the activity the viewpoint of the Russian, much grief can be deterred.

The value Americans place in economic gain results in a respect for entrepreneurs who work within the system to gain wealth and stature. However, while Americans revere their merchant image, Russians consider merchants to be leeches on the system and the working people of Russia (Taylor, 1993). Russians consider these people to be non-contributors to the system; they merely bought something at one price and sold it for a higher price because they controlled the only supply. "Under the communist system these people were called 'speculators' and were severely prosecuted and punished as criminals of the worse kind, along with murderers and traitors to the masses and to their country. Most people still refuse to consider the costs and expenses involved in purchasing, transporting and financing a business as part of the cost of a good and consider a return for risk-bearing unacceptable" (Taylor et al., 1993, p. 6).

Americans believe time is valuable and should not be wasted. For an American, a meeting should begin at a precise starting time and should end as quickly as possible. The purpose of the meeting is to accomplish a task, so the emphasis is on completing the task, not on strengthening personal relationships. This attention to time differs from that of the Russian culture. One example indicating the clash of an American's interpretation of a full workday and that of a Russian is related by Merritt J. Taylor, an American serving as the

Director of the Tatneft Model Farm in the autonomous Republic of Tatarstan in the Russian Republic. The model farm is a cooperative effort between Texas A&M University and Tatneft, a Russian oil almagamation.

Taylor's account of dealing with a labor force indicates the Russian laborers' interpretation of a full workday. Crews assembled at their division headquarters each day and boarded a bus which carried them to the building site, 10 kilometers away. They would arrive at the work site at approximately 8:30 each morning. After changing into work clothes, they would begin their individually-assigned tasks and were usually all working by 9:00 a.m. The workers would take a morning break of an undetermined amount of time during the morning, and then break again for lunch at noon. After a one-hour lunch break, the workers would return to their duties. Between 1:00 p.m. and 2:30 they would take another break, and then finish their activities for the day at 2:30. They would change clothing, and then depart from the work site at approximately 3:00 p.m. This work day allowed for approximately four hours of work to be accomplished per day, and even this labor was not continuous (Taylor, 1993).

> "The laborers seemed to have specific jobs they were expected to perform with no expectation that they would do anything else. If a person was a bulldozer operator, he was responsible for a specific machine and the work that this particular machine was scheduled to do that day. If there was nothing for the machine to do, or if the operator finished early, he would sit in the machine and read or sleep or sit in the mobile break room until the day was done" (Taylor, 1993, p.8).

In particular, those change agents who are familiar with American agriculturists will probably be disappointed with Russian agriculturists. According to James Wild, Professor of Biochemistry and Biophysics, of Genetics and of Toxiocology and former Associate Dean of the College of Agriculture and Life Sciences at Texas A&M University, who traveled to Russia to analyze Russian agriculture in 1991, there is "not an appreciation or a belief that if someone works harder there will be a reward." This differs from American agriculture. "American agriculture is based on people working incredibly hard, almost more from a cultural legacy than from good business sense. The parents of American farmers worked hard, and their community expects them to plow a straight furrow" (Wild, 1992).

Conclusions

What may be concluded from the points enumerated above? First, as American change agents attempt to understand and promote adoption of various innovations in Russian agriculture, they will need to be aware of the differences in attitudes toward privatization, risk taking, use of time, and value received from work. In addition, the change agent must realize the Russians' relationships with those in authority will differ from that which they are accustomed. "Many change programs fail because they seek to swim against the tide of clients' cultural values without steering toward clients' perceived needs. Change agents must have knowledge of their clients' needs, attitudes, and beliefs, their social norms and leadership structure, if programs of change are to be tailored to fit the clients" (Rogers, 1983, p. 320).

Second, as pointed out by Glennan and Sanders twenty-five years ago, it may be concluded that you and I, as professionals working as change agents in Russia, must recognize that our activities have unforeseen social or political consequences and our "professional choices and effectiveness may be hindered by taking certain factors for granted, based on irrelevant experience back home" (Glennan and Sanders, 1968, p.1)

Evaluation

Almost 20 years ago, Foster noted that "when rural peoples perceive concrete evidence of new opportunities, they are able to shed at least some of their traditional premises in remarkably short order. Once the threshold to modernity is crossed by a few innovative souls, an increasing flow of followers crosses over" (Foster, 1973, p. 39).

Anyone hoping to serve as a catalyst in initiating change to provide an improved

agriculture and distribution system in Russia will undoubtedly encounter opposition. However, by assessing the important aspects of the republic's culture, such as the history and values, barriers to change will be more understandable. This assessment is supported by Foster's analysis of the change agent.

> It is for reasons like this that an effective worker must thoroughly understand the social structure of a community, the forces that divide people, and the forces that draw them together. The behavior of a peasant villager, however stubborn and unreasoned it may seem to an outsider, is the product of centuries of experience. It is an effective protective device in a relatively unchanging world. It is less effective in a rapidly industrializing world, and ultimately it becomes a serious hindrance. But the peasant is pragmatic; he is not going to discard the clothing that has served him well until he is convinced that he will profit by so doing. He sees that the future holds new things, but he remembers the past" (Foster, 1973, p. 40).

Educational Importance

As the global marketplace becomes more of a reality and less of a buzzword, it is increasingly important that educators realize the necessity of having initial awareness of cultural and sociological differences and of their own biases. These biases, or ethnocentric baggage, will perpetually be carried by initiators of change into their developmental efforts.

Future endeavors in the former Soviet Union will likely depend on the success of the initial change agents working there. Each member of this audience could be called at a moment's notice and asked to coordinate a development activity in the former Soviet Union. It is important to understand these 15 countries from which we have been disassociated in the past, and it is important that we understand the individuals with whom we will come in contact. In addition, it is just as important that we understand ourselves.

"As a bridge between two differing systems, the change agent is necessarily a marginal figure with one foot in each of two worlds. His or her success in linking the change agency with his or her client system often lies at the heart of the diffusion process" (Rogers, 1983, p. 315). Can we leave our cultural baggage at home as we begin working more closely with Russian farmers?

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Working Together: Alternative Approaches to Technology Development and Adoption in Agriculture

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Introduction

Given the complexity and variability of agricultural systems and institutions throughout the world, it is not surprising that multiple models for technology development and adoption that specify quite different roles and responsibilities for researchers, extension staff and farmers have emerged. Past discussions have centered on different models of technology development and adoption as if they were competing approaches. This paper defines three alternative approaches to technology development and adoption, and assesses the strengths and weaknesses of each. This examination provides a foundation for researchers, extension staff and farmers to recognize the approaches that are appropriate to specific situations and thereby learn how to work together more effectively. The three approaches described above are summarized in Table 1: Approaches to Technology Development and Adoption.

Transfer of Technology

The prevailing Transfer of Technology (TOT) paradigm is organized as a sequence of steps that begins with research and produces a predominantly one-way flow of information through extension to farmers. Generally, the approach has been operationalized by drawing a box around a group of functions and creating a separate and dedicated organization to deal with each box (Figure 1). In general, the process is viewed as starting on the left and ending on the right as if we were reading a line in an English text book or music score. Although clear and straightforward, this linear approach to problem solving often leaves little room for the incorporation of diverse forms of input and rules out the possibility of easy iteration. The TOT model for agriculture can be most simply described as a relay race along this linear path in which the first runner sets the direction and successive runners are responsible for advancing what has been passed along to them.

Figure 1: Stylized Sequence of Steps in the Transfer of Technology.

World Stock of Knowledge	Basic Research	Applied/Adaptive Research	Dissemination	Diffusion and Farmer Adoption

Source: Adapted from McDermott (1987)

Table 1. Approaches to Technology Development and Adoption

Actors and Characteristics	*Transfer of Technology*	*Industry Led Technology Development*	*Participatory Action Research*
Overall Performance			
Strengths	Efficient in answering the questions asked; Linked to disciplines knowledge and traditions; Builds capability of scientists	Relevance to users Timeliness Saves public resources	Taps and integrates different types of knowledge/skills; builds intellectual capabilities of all participants
Weaknesses	May ask and answer wrong question; may be hampered by poor linkages Not enabling	Driven by people with resources Potential for Inequity	Time consuming; Reduced gains from specialization
Research Scientists			
Role	Set agenda/direct process	Technical Service Contract Technician External to process	Participant, co-learner, resource person, (some may facilitate)
Contributes	Knowledge/management skills	Technical knowledge	Knowledge (technical and process)
Receives	New Knowledge Professional recognition	New knowledge/ professional recognition	Insights, feedback, priorities, different perspective
Extension Staff			
Role	Adapt and disseminate	Variable/Limited	Participant, co-learner, resource person (some may facilitate)
Contributes	Technical expertise and non-formal education expertise	Neutral Evaluation	Process knowledge, technical knowledge
Receives	Community/industry recognition; new knowledge	External to process	Insights, feedback, priorities, different perspective
Farmer		**[Agribusiness Firms*]**	
Role	Audience, client, end-user, consumer, recipient	Set agenda/direct process	Resource person, co-learner, participant (some may facilitate)
Contributes	Situation, Demand for product Reaction	Leadership; technical and industry knowledge, Time/effort	Field based knowledge; Location/situation specific information; Time/effort
Receives	Information, technologies, products	Technologies they request	Sense of ownership, information, technologies
Works best for . . .	Technical problems	Technical problems	Technical problems and societal concerns
Methods	Lab research to field trials to demonstration plots	Lab research to field trials	Dialogue plus field research

* ILTD is generally led by agribusiness firms

There are three primary justifications for the significant public involvement in the TOT process for agriculture. First, because agricultural sectors are generally characterized by many small independent farms, the individual farmers do not have the resources to conduct their own research. Second, because of the structure of the market, individual farmers cannot easily retain the benefits derived from the new technologies. Third, a publicly financed dissemination or extension phase of the process is required because of the wide knowledge gap between technology developers (scientists) and the technology users (farmers). Someone must fill the role of translator between these two groups.

In comparison to other approaches we will consider, this approach treats farmers (the last runners in the relay race) primarily as recipients of technology. There is however considerable variation among the TOT approaches, ranging from research conducted in near isolation from the world of farmers, to research in which farmers are frequently questioned and/or consulted. But all TOT approaches share the assumption that scientists know or can learn what farmers need and can develop solutions to their problems using science. In short, these are the approaches in which we "do it to or for" farmers.

TOT approaches take advantage of gains from specialization as each different group focuses on its role in the process and largely ignores the roles of others. Participants in the process often feel quite comfortable within their clearly defined and specialized roles. Within this linear approach when technologies developed by researchers are not adopted by farmers two conclusions are common: 1) extension is not doing its job, and/or 2) farmers are slow to catch on to new technologies (Chambers et al, 1989).

There are, however, more likely explanations for these 'failures'. The initial research may be misdirected resulting in technologies that are inappropriate for end-user (farmer) needs. This has been particularly true for low income resource poor farmers who cannot easily communicate their needs and wishes back up the TOT chain (Merill-Sands and Kaimowitz, 1989). As a second problem, the linkage between the various groups (and not just extension) may not be sufficiently well developed to allow the chain as a whole to perform effectively. Clearly setting the initial direction and passing the baton are the most critical phases in a relay race and the same is true in TOT. If there are problems with either, TOT will not work well.

Farming Systems Research and Extension (FSR/E) developed largely as a response to these perceived problems of the top-down, linear approach to technology development. In FSR/E, more attention is paid to farmer needs and to developing appropriate teamwork among TOT participants. FSR/E is often viewed as a transitional stage between the TOT approach and the Participatory Action Research model described below.

The TOT approach to technology development has worked well in many developed countries and in some developing countries, but it should not to be viewed as the best approach in all situations. One critic, Ivan Illych, refers to specialists who practice their craft in this manner as members of the debilitating professions; professionals who insure that their services will always be in demand by never teaching their clients to perform the services themselves.

We present two alternative approaches, Industry - Led Technology Development and Participatory Action Research, that have developed as alternatives to TOT that may be more successful in certain circumstances.

Industry Led Technology Development

In developed countries, such as the United States, the standard TOT approach has been modified as a result of changing conditions. Other actors (primarily agribusiness firms) have become major players in the technology development arena. Not only do they conduct their own research, but they also provide funds to support targeted public sector research. To a much smaller extent, farmer groups also support and influence the research agenda through the provision of targeted funds (Feller, 1986; Buttel et al, 1986).

Changes also have occurred in the dissemination of new technologies. First the increase in farmer capability to directly communicate with researchers means that many producers no longer require or prefer working through extension "translators" (Feller, 1987).

Second, many additional networks for dissemination are now available including private radio, television and print organizations. Perhaps most important, may be the agribusiness firms that include dissemination as a component of an overall sales program.

In the second set of approaches, we have grouped these changes together under the broad title of "industry-led technology development (ILTD) because they all represent modifications of the TOT process. Clearly, these changes require the public sector to alter its own role since there is a reduced need to spend public funds and resources on tasks achieved by the private sector (Frisvold, 1991). Of equal importance, having the research process initiated and supported by the industry may improve the relevance and practicality of the research.

In the U.S. the dominance of privately bred varieties of the cool-season grass seed industry represents an example of this trend. The 1970 Federal Plant Variety Protection Act provided proprietary protection by granting rights to private breeders for exclusive propagation and sale of grass seed under private varietal labels. As a consequence the acreage of private variety grass seeds planted in Oregon's Willamette Valley increased from 10% of all grass seed acres in 1979 to 30% in 1987 (Conklin et al., 1989). As an example of the growth in privately developed grass seed varieties consider that as recently as 1978 only 11 tall fescue varieties were produced in Oregon. In 1991 after the dramatic increase in private breeding efforts, 131 different tall fescue varieties (representing more than 80 percent of tall fescue acreage) were in production. Since it is much more difficult for private firms to retain the benefits of agronomic research, much of that type of research is still conducted by public institutions.

An example of technology development led by farmer associations in a developing country can be found in the Senegal Natural Resources-Based Agricultural Research Project. Mechanisms established in this project help farmers and farm associations to determine research priorities relevant to their needs, to hire researchers or other technical assistance, and to hold researchers accountable for results. In this case, extension workers serve a liaison function helping farmers and farm associations to communicate and negotiate with researchers.

Several concerns have arisen in response to this new approach to technology development and adoption. First, there is the concern that the funds provided by industry will be leveraged to influence research objectives to a greater extent than the money itself would warrant. As a result, public research may be unduly directed toward private gain (Feller, 1986).

A second concern is that as the private sector replaces the public sector at various points in the technology development chain, producers and/or consumers will no longer have neutral sources of information and assistance available to them.

Returning to the previous sports analogy, ILTD can be characterized as a relay race with fewer team members and a new lead runner. As a result, two major changes occur, someone different is setting the direction (the industry) and there are fewer baton exchanges. How it compares to the TOT system will depend on a comparison of the gains from better targeting and reduced costs of research dissemination versus the losses from allowing private actors to direct the process toward their own gain.

In developed countries, ILTD exists. It is up to the public sector to retrain its personnel and reallocate its resources so that society as a whole is a net winner from this infusion of private resources and improvement in private capabilities.

Participatory Action Research

The third approach to technology development and adoption more fully integrates farmers as co-learners and co-participants in a participatory action research (PAR) process. PAR approaches assume that farmers, scientists and extensionists all contribute critical but different types of knowledge to the process of technology development. The approach is informed by theories under the co-learning or participatory action research paradigm. In these approaches, action is taken "with" farmers rather than done to them or on their behalf. Technology transfer does not occur as a separate activity because technologies are jointly developed with farmer and researcher involvement.

While ILTD represents a fine-tuning and streamlining of TOT, the third approach, PAR, represents a fundamentally different concept of the entire process. An alternative to the relay race approach offered by Takeuchi and Nonaka (1986) is a team composed of all required specializations working together much as a rugby team composed of players representing different positions moves the ball down field as a unit passing the ball back and forth. This allows for a reduction in specialization and for cross-fertilization to occur among team members, encourages "multilearning" of different aspects of the process and has led to paradigm busting and technological breakthroughs.

According to Lewin (1946), action research is special in two ways. First, the client is involved as an active collaborator in the generation of knowledge. Second, action research takes place in the real world and derives lessons from that world. Whyte (1991), who shares Lewin's view observed that:

> Science is not achieved by distancing oneself from the world; as generations of scientists know, the greatest conceptual and methodological challenges come from engagement with the world.

Field observation in agriculture of the failure of a top-down model of technology development led Rhoades, Booth, Chambers and others to develop models such as Farmer-Back-To-Farmer.

> This model of applied agricultural research and development focuses on the identification and solution of farmers' problems and requires interdisciplinary teamwork and consultations with farmers in all phases of a continuous research diffusion process (Horton, 1991).

PAR approaches avoid what Roling (1982) called the "splendid isolation" of technology innovation as they clearly attempt to break with traditional, top-down, scientist-driven

technology transfer. One of the conceptual foundations for this thinking is found in the writings of Freire (1980), who argued for the abolishment of sender-receiver relationships and favored the notion of learners engaged in a process where both could contribute and both would benefit.

MaClure and Bassey (1991) state that three particular attributes distinguish Participatory Action Research from traditional research strategies. Participatory Action Research:

1. Assumes shared ownership of the research enterprise,
2. Is a method of community-based learning,
3. Aims to stimulate community-initiated action.

Since the process instills in participants a sense of personal identification and ownership with the learning or discovery effort, it is much more likely the participants will apply what they have learned.

Although some have argued that Participatory Action Research as described by Whyte is no different from the approach taken in FSR/E, we do not share that view. The FSR literature focuses on developing procedures to enable social and technical scientists to work together to learn from but not with farmers. In contrast, farmers are viewed as participants in a three-way co-learning process among social scientists, technical scientists and farmers.

An established NGO, World Neighbors, began using an "experimenting farmers" approach more than two decades ago (Bunch, Ewert and Gobbels, 1992). The approach grew out of a recognition of the natural abilities of farmers to conduct independent inquiry for problem solving. Progress is being made in valuing and utilizing indigenous knowledge in the agricultural research and development process (Warren, 1989).

Roling (1982) displays thinking along similar lines. He describes an alternative to production oriented extension approaches. His approach is entitled Human Resource Development:

> Human Resource Development is an extremely different tradition. Key words are community development, institution building, emancipation, leadership development, normative/re-educative strategies, mobilization, organization, developing delivery systems and so on. The focus is not on developing natural resources through people, but on rural people themselves and on the social system in which they function.

At the root of these processes is the empowerment of farmers. This is coupled with the recognition that those closest to the problems have the best ideas about solving them. A phrase that was coined by adult educators in 1988 is an appropriate phrase for describing the an expanded role for farmers in the technology development process. "Transformative research" was defined by Deshler and Selener (1988) as research that is ethical, emancipatory, empowering, and holistic, and which leads to social transformation. Through complete participation in the design and conduct of research, farmers and their circumstances are improved or transformed.

PAR facilitates the learning among farmers, extension workers and scientists and draws more fully on farmers indigenous knowledge systems. Farmers learn to manage their own technology acquisition system for access to resources of technical assistance, inputs, and other needs. Farmers create new knowledge rather than serve as recipients of new knowledge. These approaches aim to instill capacity in farmers to shape their own destiny. They encourage research which helps to transform both the individual through empowerment and the

production system through technology improvement. Due in large measure to the multiple perspectives incorporated in the PAR process it has proven to be an effective approach to solving complex problems occurring at the interface between technology and society. PAR is an especially useful approach in sustainable agricultural research and extension in that it is able to incorporate complex technologies to assist the many small growers who operate within complex systems.

Educational and Institutional Challenges

In the future some problems and situations will require public sector scientists/extension staff to continue to function as relay runners and effectively pass the baton from one leg of the race to the next. In other instances, private sector actors will step in and fulfill some of these roles and the public sector will have to figure out how to better coordinate their activities with private sector researchers and disseminators. This will include revising priorities and serving as a neutral evaluator of privately developed technologies.

Public sector change agents will need to assess situations and determine what problem solving approach is best for the specific situation. Government sponsored change agents have not been, nor can they be, all things to all people. These change agents will not have the luxury of continuing to operate in familiar and traditional patterns as they respond to public demands in the new environment of scarce resources.

Finally, in seeking to work with some audiences and seeking to work on some problems, public sector personnel will have to learn new skills and new ways of doing business. Job responsibilities will be blurred, responsiveness to clientele needs will be increased and process skills such as group facilitation will be required. The precision of a relay race will need to be replaced by the messiness of a rugby scrum. Training for future participants in the scrum will require the introduction of new sets of skills and behaviors.

To support the simultaneous achievement of these multiple models of technology development and adoption will require flexible and responsive institutions. In general, this implies a decentralization of authority so that appropriate local decisions can be made as well as a reduction of internal barriers to permit cooperation across functions and disciplines.

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Session E

SUSTAINABLE AGRICULTURE

Paper #1. **TITLE XII COORDINATORS PERCEPTIONS REGARDING SUSTAINABLE AGRICULTURE**
by
Lydia Ori and Barbara A. Hold
Louisiana State University

Paper #2. **A FRAMEWORK FOR INCORPORATING INDIGENOUS KNOWLEDGE SYSTEMS INTO AGRICULTURAL EXTENSION ORGANIZATIONS FOR SUSTAINABLE AGRICULTURE DEVELOPMENT IN INDIA**
by
B. Rajasekaran, Robert A. Martin, and D. Michael Warren
Iowa State University

Paper #3. **REACHING MALAWIAN SMALLHOLDER FARMERS WITH AGRICULTURAL EXTENSION PROGRAMS: THE CASE FOR INCREASED USE OF WOMEN-FARMER GROUPS**
by
Vickie A. Sigman, Catherine Chibwana and Isabel Matenje
Idaho State University

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TITLE XII COORDINATORS' PERCEPTIONS REGARDING SUSTAINABLE AGRICULTURE

Lydia V. Ori[1] and Barbara A. Holt[2]

INTRODUCTION

The issue of sustainability has major implications for development of the Third World and for global security. Through the Foreign Assistance Act (Title XII), the Board of International Food and Agricultural Development (BIFAD) was created. Its mission is to bring together expertise from the agricultural complex in universities so that they can interact with programs of the U. S. Agency for International Development (USAID). A study of the perceptions of BIFAD program officers toward sustainable agricultural systems can aid in characterizing sustainable agriculture, making decisions on selected practices important to sustainable agriculture, and designing ways to promote them.

PURPOSE

The purpose of this study was to determine the perceptions of BIFAD program officers toward (1) sustainable agriculture, (2) practices used to sustain agriculture, and (3) ideas on promoting sustainable agriculture.

METHODOLOGY

The population of this study was the 157 Title XII coordinators/ representatives in Land Grant Universities whose responsibilities include coordinating agricultural activities in international development on a daily basis.

The instrument used was a two-part mail questionnaire. Part one contained questions regarding agriculture practices important to sustainable agriculture and program officers' opinions on actions important to the promotion of sustainable agriculture. The second part of the questionnaire contained demographic data and questions related to participants' experiences gained on their international field assignments. Content validity of the instrument was assessed by Louisiana State University (LSU) faculty in the School of Vocational Education; the Departments of Agronomy, Agricultural Economics, Entomology, and Sociology; and doctoral students interested in international development. The instrument was field tested

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with fifteen LSU faculty actively involved in international agricultural development. Of the 157 questionnaires mailed, 103 were returned. Eleven of the questionnaires were unusable, resulting in a usable sample of 92 (58.6%). A telephone follow-up of non-respondents was conducted and resulted in 21 responses. Statistical analysis revealed that the respondents in the study were not different from the non-respondents, so answers from respondents were considered representative of non-respondents.

Descriptive statistics were used on all objectives to analyze program officers' perceptions regarding sustainable agriculture.

RESULTS

Objective 1

The first objective was to define sustainable agriculture as perceived by BIFAD Program Officers. Respondents were asked to indicate their choice of three of seven statements regarding sustainable agriculture that were drawn from sources in the literature. They rated these three definitions as best, second best, and third best. Table 1 displays the choices of respondents regarding the seven statements.

Definition H was most frequently selected (40.2%) as the best, followed by definitions A (22.8%) and F (15.2%). Definitions B, E, G, and C were less frequently chosen by the participants as the best definition of sustainable agriculture. None selected definition D as "best" (see Table 1).

Table 1: Respondents' Top Three Choices of Good Definitions of Sustainable Agriculture (N = 92)

	Rating of Definitions			
	Best	2nd Best	3rd Best	NR[a]
Definitions	n %	n %	n %	n %
(Definition H) Sustainable agriculture is "an agriculture that over the long term, -enhances environmental quality and the resource base on which agriculture depends, -provides for basic human food and fiber needs, -is economical viable, and -enhances the quality of life for farmers and society." (ASA/CSSA/SCCA, 1989)	37 40.2	25 27.2	14 15.2	16 17.4
(Definition A) Sustainable agriculture is "the successful management of resources for agriculture to satisfy human needs while maintaining or enhancing the natural resource base and avoiding environmental degradation." (BIFAD, 1988)	21 22.8	20 21.7	28 30.4	23 25.1

Table 1: Respondents' Top Three Choices of Good Definitions of Sustainable Agriculture (N = 92)

Definitions	Rating of Definitions: Best n %	2nd Best n %	3rd Best n %	NR[a] n %
(Definition F) Sustainable agriculture is "a management strategy which helps the producer to choose hybrids and varieties, soil fertility packages, pest management approaches, tillage systems, crop rotation to reduce the cost of purchased inputs, minimize the impact of the system on the immediate and the off-farm environment, and provide a sustained level of production and profit from farming." (Francis, et al., 1987)	14 15.2	8 8.7	3 3.3	67 72.8
(Definition B) Sustainable agriculture is "the ability of an agricultural system to maintain production over time, in the face of ecological difficulties and socio-economic pressures." (BIFAD, 1988)	8 8.7	6 6.5	3 3.3	75 81.5
(Definition E) Sustainable agriculture "manages resources to satisfy human needs, conserves natural resources, and continues or enhances the quality of the environment." (York, 1988)	5 5.4	20 21.7	29 31.5	38 41.4
(Definition G) Sustainable agriculture "evolves indefinitely toward greater human utility, greater efficiency of resource use and a balance with the environment that is favorable to humans and other species." (Harwood, 1988)	4 4.3	5 5.4	4 4.3	79 86.0
(Definition C) Sustainable agriculture "conserves and protects natural resources and allows for long term economic growth by managing all exploited resources for sustainable yields." (BIFAD, 1988)	3 3.3	8 8.7	7 7.6	74 80.4
(Definition D) Sustainable agriculture "implies raising the productivity of resource poor farmers who cultivate marginal lands, especially hillsides, and the improvement of their agricultural production systems and will require low-input, labor intensive methods rather than capital - and energy - intensive technologies." (Altieri, 1989)	0 0.0	2 2.2	1 1.1	89 96.7

[a]refers to the respondents that did not choose the definition as one of their top three.

Objective 2

The second objective of the study was to determine the degree of importance of practices to sustain agriculture as perceived by individuals coordinating Title XII activities on a daily basis in the United States. Respondents were asked to indicate their perceptions of the degree of importance of each of 19 selected practices. Each practice was rated on a Likert-type scale from one to four (with one indicating high importance and four indicating no importance). Three respondents were omitted from the data analysis in Objective 2 because of no response to the survey questions. Table 2 presents percentages, overall means and standard deviations in descending order of the mean perceived importance of the practices.

Table 2: Perceived Importance of Selected Practices to the Success of Sustainable Agriculture (N = 89)

	Level of Importance[a]					
	1	2	3	4		
	HI	MI	LI	NI	M	SD
Practice	n %	n %	n %	n %		
Soil conservation	77 86.5	11 12.4	1 1.1	0 0.0	1.15	0.39
Water conservation	70 78.6	15 16.9	3 3.4	1 1.1	1.27	0.58
Biological diversity of crops	62 69.7	26 29.2	1 1.1	0 0.0	1.32	0.49
Energy conservation	65 73.0	19 21.4	3 3.4	2 2.2	1.35	0.66
Integrated pest management	60 67.4	26 29.2	3 3.4	0 0.0	1.36	0.55
Nutrient recycling	60 67.4	25 28.1	4 4.5	0 0.0	1.37	0.57
Crop rotation	51 57.3	38 42.7	0 0.0	0 0.0	1.43	0.49
Biological control of pests	50 56.2	32 36.0	6 6.7	1 1.1	1.53	0.67
Profitable marketing strategies	51 57.3	24 27.0	10 11.2	4 4.5	1.63	0.86

Table 2: Perceived Importance of Selected Practices to the Success of Sustainable Agriculture (N=89) (CONTINUED)

Practice	Level of Importance[a] 1 HI n %	2 MI n %	3 LI n %	4 NI n %	M	SD
Polyculture of crops/multiple cropping	34 38.2	34 38.2	19 21.4	2 2.2	1.66	0.82
Reduced pesticide application	37 41.6	42 47.2	10 11.2	0 0.0	1.70	0.66
Use of energy alternatives	38 42.7	39 43.8	9 10.1	3 3.4	1.74	0.78
Minimum tillage	35 39.3	41 46.1	13 14.6	0 0.0	1.75	0.69
Biological diversity of livestock	32 36.0	44 49.4	11 12.4	2 2.2	1.81	0.82
Using non-chemical weed control	28 31.5	40 44.9	18 20.2	3 3.4	1.96	0.81
Organic fertilizers	26 29.2	33 37.1	28 31.5	2 2.2	2.07	0.83
Reduced mechanical cultivation	19 21.4	41 46.1	23 25.8	6 6.7	2.18	0.85
Leaving land fallow	13 14.7	22 24.7	40 44.9	14 15.7	2.62	0.92
Use of intensive labor	9 10.1	24 27.0	44 49.4	12 13.5	2.66	0.84

[a]Level of importance: 1 = High Importance, 2 = Moderate Importance, 3 = Low Importance, and 4 = No Importance

Sixty percent or more of the respondents perceived the practices, soil conservation, water conservation, biological diversity of crops, energy conservation, integrated pest management, and nutrient recycling, of high importance to the success of sustainable agriculture. The means for these practices varied from 1.15 for soil conservation to 1.37 for nutrient recycling. The pertinent data are presented in Table 2.

Additionally, 50 to 60 percent of the respondents regarded the practices, crop rotation, biological control of pests, and profitable marketing strategies also of high importance to the success of sustainable agriculture. The means of these practices ranged from 1.43 to 1.63. Leaving land fallow (M = 2.62) and use of intensive labor (M = 2.66) were considered of lowest importance to the success of sustainable agriculture.

In addition to the items in Table 2, respondents were given the option to suggest two additional practices that in their opinions were important to the success of sustainable agriculture. Genetically improved crops and multiple land use were the most frequently suggested practices.

Objective 3

The third objective of the study was to determine the opinions of participants on actions perceived important for the promotion of sustainable agriculture. Respondents were asked to indicate their levels of agreement or disagreement for each of the items using the following Likert-type scale: 1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, and 5 = strongly disagree. Percentages, mean scores, and standard deviations for each of the 19 actions regarding the promotion of sustainable agriculture are presented in descending order of mean importance in Table 3.

About 50 percent of the respondents strongly agreed that the actions, incorporate the ecological dimensions of the economy, trade and industry into agricultural policies (M = 1.60), develop technologies to extend the environmental resource base while reducing damage (M = 1.64), and give the public greater access to information regarding the environment (M = 1.65) were important in promoting sustainable agriculture.

The action, encourage control of population growth, ranked fourth in terms of mean score (1.81). However, the greatest number of participants (54.3%) strongly agreed that it was important to the promotion of sustainable agriculture. Fewer than half of the respondents strongly agreed that the actions, support agricultural policies containing economic incentives (M = 1.99) and educate farmers about scarcity of natural resources (M = 1.91), were important to the promotion of sustainable agriculture. Although fewer respondents strongly agreed that the actions, encourage voluntary compliance with environmental regulations, promote private technical assistance and government assistance programs, and encourage government regulations regarding the environment, a majority of the respondents agreed that these actions were important to the promotion of sustainable agriculture.

In addition to the items in Table 3, the respondents were given the option to add at least two actions that in their opinions were important to the success of sustainable agriculture. Thirteen respondents suggested actions with which they strongly agreed. Changing economic and educational policies and strengthening research and extension institutions were among actions suggested by the respondents.

Table 3. Actions Perceived Important to the Promotion of Sustainable Agriculture (N = 92)

Action	Level of Agreement[a] 1 SA n %	2 A n %	3 UD n %	4 D n %	5 SD n %	M	SD
Incorporate the ecological dimensions of the economy, trade, and industry into agricultural policies	45 48.9	40 43.5	6 6.5	1 1.1	0 0.0	1.60	0.66
Develop technologies to extend the environmental agricultural resource base while reducing damage	46 50.0	36 39.1	7 7.6	3 3.3	0 0.0	1.64	0.76
Give the public greater access to information regarding the environment	43 46.7	39 42.4	9 9.8	1 1.1	0 0.0	1.65	0.70
Encourage control of population growth	50 54.3	19 20.7	16 17.4	4 4.3	3 3.3	1.81	1.08
Educate farmers about scarcity of natural resources	30 32.7	44 47.8	14 15.2	4 4.3	0 0.0	1.91	0.85
Support agricultural policies containing economic incentives	37 40.3	31 33.7	16 17.4	4 4.3	4 4.3	1.99	1.07
Encourage voluntary compliance with environmental regulations	23 25.0	51 55.4	7 7.6	9 9.8	2 2.2	2.09	0.96
Promote private technical assistance programs	17 18.5	50 54.3	18 19.6	6 6.5	1 1.1	2.17	0.81
Promote public participation in decision making	25 27.2	33 35.8	24 26.1	9 9.8	1 1.1	2.22	0.99
Promote more innovative public action	25 27.2	34 36.9	23 25.0	8 8.7	2 2.2	2.22	1.01
Promote government assistance programs	19 20.6	34 37.0	33 35.9	6 6.5	0 0.0	2.28	0.87
Encourage government regulations regarding the environment	18 19.6	42 45.6	19 20.6	10 10.9	3 3.3	2.33	1.01

[a]Level of agreement includes: 1 = strongly agree; 2 = agree; 3 = undecided; 4 = disagree; and 5 = strongly disagree.

RESULTS/CONCLUSIONS

From demographic data collected by the questionnaire it was learned that one-fourth of the BIFAD program officers did not have international experience. The majority of them were relatively older people who possessed both administrative and technical skills, but had less command of foreign languages. Program officers

agreed most closely with the definition of sustainable agriculture proposed by the American Society of Agronomy to emphasize the economic, environmental and socio-cultural dimensions of agricultural development. Practices perceived as most important to the success of sustainable agriculture pertained to: soil, water, and energy conservation; biological diversity of crops; integrated pest management; and nutrient recycling. Proposed actions that were considered to be highly important to the promotion of sustainable agriculture included: incorporation of the ecological dimensions of the economy, trade, and industry into agricultural policies; developing technologies to extend the environmental agricultural resource base while reducing damage; giving the public greater access to information regarding the environment; and encouraging control of population growth.

EDUCATIONAL IMPORTANCE

The results of this study could assist persons who plan international programs. As they develop projects for Third World governments they have opportunities to emphasize sustainability in allocation of resources. Information from this study may help people in international development examine their philosophies of sustainable agriculture and sustainable agricultural systems. Specifically, these results may aid BIFAD program officers and others who plan international development projects to encourage (1) only appropriate sustainable farming and pest control practices to be used in agricultural foreign assistance programs; (2) education, training and technical programs that promote practices that are well suited for the socio-economic, cultural, and environmental conditions of the country to which technical assistance is provided so that there will be useful materials and experienced assistance available to farmers and others in their adaptation of sustainable practices; (4) the establishment of interdisciplinary sustainable agricultural research, teaching and extension programs at all Title XII universities, and (5) strong leadership to coordinate university wide efforts regarding conferences, adaptation, legislature, research, and funding of sustainable agriculture.

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A Framework for Incorporating Indigenous Knowledge Systems into Agricultural Extension Organizations for Sustainable Agricultural Development in India

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Paper Accepted for Presentation at the 1993 Association for International Agricultural and Extension Education Conference, March 18-20, Arlington, Virginia, U.S.A.

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Introduction

Indigenous knowledge (IK) is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture (Rajasekaran, 1992). Local people, including farmers, landless laborers, women, rural artisans, and cattle rearers, are the custodians of indigenous knowledge systems (IKSs). These indigenous knowledge systems may appear simple to outsiders but they represent mechanisms to ensure minimal livelihoods for the rural resource-poor people in India. During the process of technology development, farmers' informal experimentation are not considered as a source of innovation (Rajasekaran and Martin, 1990). During the process of technology dissemination, feedback information from farmers after the introduction of technologies is rarely recorded. Farmers' needs, priorities, and innovations are not considered while developing and disseminating technologies.

Indigenous knowledge is dynamic, changing through indigenous mechanisms of creativity and innovativeness as well as through contact with other local and international knowledge systems (Warren, 1990). Understanding farmers' knowledge allows a framework of reference for posing technical, scientific questions in research. It also provides the basis for evolving technological options that are not imposed as alien 'packages' which contradict its existing practices (Scoones, 1989). For instance, technological interventions with respect to agroforestry must be based on the principles of ethnobotany, agroecology, and farmers' experiments on home gardens (Rocheleau, 1987). Therefore, identifying, documenting, and incorporating indigenous knowledge systems into agricultural extension organizations are essential in order to achieve sustainable agricultural development.

Purpose

The purpose of this paper was to present a methodological framework to incorporate indigenous knowledge systems into agricultural extension organizations for sustainable agricultural development in India.

A recent study was conducted in three villages of the Union Territory of Pondicherry, India. Indigenous knowledge systems (IKSs) were recorded using farmer participatory methods such as participant observations, and unstructured interactions (Rajasekaran, 1992). The findings of the study revealed that IKSs can provide a frame of reference for strengthening agricultural extension programs. The findings of the study have led the researchers to the development of a framework for incorporating IKSs into agricultural extension organizations. This paper focuses the development of the framework.

Framework Development

Need for the framework

The need for researcher-farmer involvement has been given high priority in the recent farming systems research/ extension literature. However, it is difficult for research station scientists to conduct research involving farmers all the time due to the insufficient human resource capacity of regional research stations (Rajasekaran and Martin, 1990; Warren, 1991). For instance, there is only one research station in the Pondicherry region, India, which is expected to cater to all agricultural research needs of the entire region. There are approximately twenty scientists working in this station. This number is far too low when compared to the number of farming communities in the region. Keeping this low researcher-farm family ratio in view, the framework advocates the use of academically well-trained and "research minded" extension personnel to identify, record, and validate farmer experiments.

Subject matter specialists as researchers

Recent statistics show that most of the divisional-level subject matter specialists (SMSs) are post-graduates in different disciplines such as agronomy, soil science, entomology, and plant breeding. Moreover, the department of agriculture is sponsoring extension personnel to undergo post-graduate training in the specialized disciplines mentioned above. The advanced knowledge they acquire during this training period along with their field experience as SMSs should be used for validating farmer experimentation. It was found that SMSs spend most of their time in headquarters assisting their heads of offices, and preparing periodical reports to be sent to their higher authorities (Rajasekaran and Martin, 1990). In other words, the academic training acquired by the SMSs is rarely exploited. They should spend at least one day in a week on activities such as: (1) problem identification; (2) recording relevant IKSs; and (3) presenting the problems and IKSs to the technology development consortium.

Recording relevant indigenous knowledge systems

Indigenous knowledge (IK) is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture. IK is dynamic, changing through indigenous

mechanisms of creativity and innovativeness as well as through contact with other local and international knowledge systems (Warren, 1990). In the process of technology development, knowledge of indigenous livelihoods is an indispensable resource (Haverkort and Zeeuw, 1992). Indigenous knowledge may not be as abstract as scientific knowledge. It is often concrete and always dynamic. It relies strongly on intuition, directly perceivable evidence, and an accumulation of historical experiences (Farrington and Martin, 1987). Indigenous knowledge reflects the dignity of the local community and puts its members on an equal footing with the outsiders involved in the process of technology development (Haverkort and Zeeuw, 1989). Indigenous knowledge systems also provide mechanisms for facilitating understanding and communications between outsiders (extensionists, researchers) and insiders (farmers). Improved understanding and communications enhance participatory approaches to problem identification (Warren, 1992c).

Recording the indigenous knowledge systems (IKSs) of farmers forms the first step of developing and disseminating sustainable agricultural technologies. In other words, how do farmers try to overcome or adapt the problems using their own knowledge? For instance, informal exchange of rice seeds from farmer-to-farmer is used as a strategy by farmers to solve the growing demands of quality rice seeds in the study villages. The SMS in coordination with agricultural officers should record IKSs.

Developing extension programs to validate farmer experimentation

There are farmers who are always experimenting and are involved in informal research and development activities (Biggs, 1990). Roling and Engel (1992, p.127) warned that, "to look at farmers only as users neglects the important fact that farmers are experimenters and that farmers have developed most of the technology used on the farm today." Specific extension programs should be targeted towards strengthening what farmers are already experimenting. Farmer experimenters are those farmers who conduct experiments in order to evaluate certain indigenous technical practices in their own way. Validating farmer experiments is an extension process in which SMSs encourage farmers to replicate their own experiments in their own environment in order to: (1) understand experiments in the socio-cultural and agro-ecological environments, and (2) determine the impact of the experiments on productivity, profitability, and sustainability of the agricultural system.

During bi-weekly training programs, separate sessions should be allotted to develop extension programs for validating farmer experiments. The various steps involved in the process of developing the extension programs are: (1) selecting "research minded" village extension workers; (2) identifying "research minded" farmers who are already involved in farmer experiments; and (3) establishing programs for validating farmer experiments.

Validating farmer experiments

Selection of farmers is one of the crucial activities during the process of validating farmer experiments. The various steps involved during the process of validating farmer experiments are: (1) Understand the rationale behind farmer experimentation. Examples are testing varieties for yield increase, blending local and external inputs, avoiding risks by adjusting sowing and harvesting periods, and testing new varieties for local adaptation; (2) Recording the mode of conducting experiments. For instance, some farmers conduct varietal trials by raising local and high yielding varieties in two different plots. Others establish experiments by planting the local and new varieties in alternate rows; and (3) Identifying farmers' evaluation criteria. The criteria used by farmers to evaluate their own experiments differ from farmer to farmer and also for the same farmer, from crop to crop. Physical stand of the crop and the way it bears the earheads is one of the major criteria for rice farmers in the Eastern Visayas region of Philippines (Tung, 1992). In the study villages, farmers randomly uproot one or two groundnut crops and shake the pods by holding them close to their ears. If they hear any sound, it indicates that the pods are unfilled. If they do not hear any sound, it indicates that the pods are filled. Understanding, identifying, recording, and evaluating farmer experiments form the various stages of validating farmer experiments. It is important that extension personnel understand the farmers' own criteria when they explore indigenous approaches to farmer experimentation.

Facilitating village-level experimenter workshops

Experimenter workshops should be conducted immediately after validating farmer experiments. The village extension workers should facilitate the experimenter workshops by involving farmer experimenters as resource persons. The SMSs should act as semi-silent observers during these workshops. This process is a way of empowering and respecting village-level extension workers and farmers. Farmer experimenters should be encouraged to share their experiences while conducting the experiments. They are expected to answer specific questions raised by other participant farmers. After the formal discussion, the SMSs should wrap up the workshop by sharing their experiences during the process of validating farmer experiments. The village extension worker should act as a facilitator by bringing farmers to the subject of discussion when conflicts arise and also monitor the time.

Evaluating technological options

Finally, farmer experimenters with inputs from other farmers should evaluate the technologies that have been tested during the farmer experimentation procedure in terms of their contribution to: (a) productivity of crops and associated livestock, (b) sustainability of the agricultural system, (c) complexity (e.g., ease of experimentation), and (d) labor intensity. They are expected to arrive at any one of the following decisions:

1. Drop the technological option that has been tested;
2. Technological option needs long-term research; and

3. Technological option is ready for further dissemination.

Technological options that need long-term research should be communicated to researchers through the technology development consortium. Technological options that are ready for further dissemination but require additional resources and infrastructural facilities should be discussed with appropriate departments. Technological options that are ready for further dissemination can be communicated to their colleagues through zonal workshops.

Technology dissemination through the agricultural extension system

Compton (1989) stated that extension personnel blanket the countryside. This enormous human resource capacity should be effectively utilized for disseminating technologies to distant locations and other villages. In spite of the continuous debate regarding the effectiveness of the Training and Visit (T&V) extension system, the T&V stands as the single major source for formal technology dissemination in many developing countries. The T&V system of extension has sought to operationalize a strong and regular link between research and extension, and between extension and farmers (World Bank, 1990). The salient features of the T&V such as (1) monthly zonal workshops; (2) biweekly training programs; (3) village extension workers contact with farmers; and (4) maintaining extension worker-farm family ratio can be effectively utilized. The potential of the T&V system of extension in increasing agricultural productivity has been clearly demonstrated (Antholt 1992; Feder, Slade and Sundaram, 1986).

Bringing original innovators to zonal workshops

Monthly zonal workshops are the important points where farmer experimenters as original innovators of technologies need to be recognized. It is essential for agricultural extension personnel to listen to the farmer experimenters whose raw materials (IKSs) contributed to the development of finished products (technological options). Encouraging the farmer experimenters by offering cash prizes is one of several ways of providing recognition and compensation for their contribution to the development of technologies. Such rewards also encourage their colleagues to share their knowledge by participating in the process of developing technological options.

Screening technological options

The SMSs receive technologies from zonal workshops and relay them to their village-level extension workers without tailoring these technologies to the agro-ecological and socio-cultural conditions of their own division (Rajasekaran and Warren, 1992). Once the technological options are disseminated to extension personnel, it is their responsibility to screen those options by considering the following factors:

1. SMSs should select those technological options that fit into agro-ecological environments of their division; and

2. SMSs should work with village-level extension workers in understanding the socio-cultural factors that have a negative impact on selected technological options.

Disseminating technological options to village extension workers

After screening, the technological options should be disseminated to village extension workers. During the process of dissemination, SMSs should act as facilitators rather than simply conducting training programs for the village extension workers. The adaptability of technological options should be discussed with village extension workers. The technological options that are disseminated to village-level extension workers using these steps differ from the existing system of delivering technologies in the following ways:

1. Technologies delivered by the existing research-extension system are fixed packages and rarely provide any options to farmers. The system expects the farmers to adopt an entire package. On the other hand, the technologies that are developed using the proposed framework provides diversified technological options which enable farmers to choose using their own decision-making system;
2. Presently technologies rarely build on IKSs of farmers. In the new approach, technological options presented to farmers originate from the farmers' own knowledge; and
3. Under the conventional system, technologies come from only one source, the research stations. In the suggested system, the technological options are developed using diversified sources such as extension agents, NGOs, farmers, and research stations in active participation with "research minded" farmers.

Disseminating technologies using indigenous communication channels

Village extension workers should be encouraged to follow certain guidelines while disseminating the technological options. The agricultural officers should be made responsible for providing institutional support for the village extension workers during the process of disseminating the technologies. Organizing training programs to explore indigenous communication channels for disseminating the selected technological options is essential (Mundy and Compton, 1991). Village extension workers should be encouraged to use delivery points other than farms such as *shandis* (market days), *koil thiruvizha* (village temple days), *magalir mandram* (a village-level women's society), and cooperative marketing points.

Educational Importance

Incorporating indigenous knowledge systems into agricultural and extension education programs will result in: (1) understanding the 'emic' perspectives of local people; (2) bridging the communication gap between outsiders and insiders; (3) recognizing the accomplishments of local farmers; (4) helping outsiders familiarize themselves with local conditions

and abstract terms; and (5) increasing the participation of farmers and their organizations in integrating, utilizing, and disseminating what already exists.

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Reaching Malawian Smallholder Farmers with Agricultural Extension Programs: A Case for Increased Use of Women-Farmer Groups

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Introduction

A global critique of agricultural extension holds that its efforts are directed towards or its benefits accrued by the relatively largeholder, rather than the smallholder, farmer. This is of particular concern in Malawi where the average farm size is about 1.1 hectares, about one-half of farms are less than one hectare, and about 5% of farms are over three hectares (MOA, 1990).

Increasing the farm productivity and the quality of life of **smallholder farmers** is the overall aim of Malawi's National Rural Development Program V. The Ministry of Agriculture (MOA) administers this program through its research, extension, and other departments. During 1986-1992, the Malawi Agricultural Research and Extension (MARE) Project, funded by U.S. Agency for International Development and the MOA, provided technical assistance through the Consortium for International Development with Oregon State University as lead University, to further build MOA capacity to reach national rural development aims. As an institution-building project, MARE focused on research, training, and extension within the context of **smallholder** agriculture. The Project stressed further strengthening the Women's Programme in the MOA Department of Agricultural Extension and Training.

The Department of Agricultural Extension and Training explicitly considers women farmers a specific client group of its agricultural extension services and programs. Women farmers are Malawi's primary food producers (Koopman, 1989, p.2). They account for two-thirds of all full-time farmers responsible for the daily food supply (cited in Chibwana's, 1989, review of studies: Clark, 1975; Evans, 1984; Hirschmann and Vaughan, 1984; Spring et al., 1983). They make numerous agricultural production decisions. Recent survey results report that extension staff and local leaders estimate women make at least one-half of agricultural production decisions (Culler, Patterson, & Matenje, 1990). They are involved in both food and cash crop productions. A review of several studies suggests "that in households where cash crops are grown, women do

as much work as men, often doing activities believed to be done only by men" (Ngwira, 1987, p. 25). In short, they are producing farmers.

Women farmers advise, and the literature confirms, they typically face land, labor, and capital constraints to increasing their agricultural production (Culler, Patterson, & Matenje, 1990; Ariza-Nino, 1991; Koopman, 1989). This is particularly so for female household-heads, although there are variations in constraints among female household-heads (Rao Gupta, 1990).

Intensification of the effort to reach and respond to rural women's agricultural needs and opportunities began around 1981 with the reorganization of the Women's Program. Delivering extension programs via Women's Groups is central to this effort.

Women's Groups are organized primarily for the purpose of interacting with the agricultural extension service. They are a critical contact point for field-level extension agents. Both men and women agents organize and interact with Women's Groups. Primarily agriculturally-focused, these groups aim to increase production in such diverse crops as maize, vegetables, sunflower, and cotton. Income-generating activities and home and farm management skills are also included in the extension offering. Group members are women only. Members may obtain agricultural credit through their Women's Group, although not all Women's Groups opt to do so.

Purpose of the Paper

The purpose of the paper is to report and discuss research findings which explore the following questions: To what extent have Women's Groups functioned to reach farmers in the smallholder sector? How effective are Women's Groups in reaching smallholder farmers, as compared to other extension delivery methods? The paper reports data on land holding size of farmers, who are members of Women's Groups, and compares these data with the land holding size of farmers reached through the extension methods of personal visits, field visits, demonstrations, meetings, and day training courses taken together. For purposes of this paper, these latter extension methods are identified by the term, customary extension methods.

Methods and Data Sources

Individual interviews, Focus Group Interviews, and a Participatory Action Research group interviewing technique were the primary data collection methodologies used in the field-based study. A desk review of secondary data were also conducted.

Based on a stratified sampling procedure, primary data were collected in Malawi during 1992 from 30 Extension Subject Matter Specialists, 73 extension field-level agents (Farm Home Assistants and Field Assistants), and 162 women farmers belonging to extension-organized Women's Groups. The membership of groups interviewed included

both females residing in male-headed households (F in MHH) and female household-heads. Female household-head (FHH) is defined as a woman who is living alone without a male because of being widowed, divorced, abandoned, unmarried, or polygamous or, a women who has a husband who returns to the home less than once a month (NSO, 1984). Data were collected from five of the eight Agricultural Development Divisions (the regional framework for organizing extension). During group interviews with women farmers, women reported the number of hectares they cultivated during the last growing season.

Secondary data, from unpublished data in Malawi's *1987/88 Annual Survey of Agriculture*, Worktable 8.3 on Extension Participation Rate by Holding Size Category were analyzed in the study. This survey provided data on (1) number of farmers surveyed by land holding size and (2) percent of farmers surveyed, in each land holding size category, reached through any of the customary extension methods of personal visits, field visits, demonstrations, meetings, and day training courses. To determine the percentage of all farmers surveyed *and* reached by customary extension methods by holding size category, the following computations were made: The number of farmers reported in each holding size category was multiplied by the percentage of farmer's reported reached in that holding size category through any of the customary extension methods. This gives a new distribution which can be converted to percentages.

In order to compare data from women farmer's on *area cultivated* with survey data on *land holding size*, the figures women reported on *area cultivated* were increased by a correcting factor. The correcting factor used is based on earlier survey data showing that for male-headed households, an average of 6% of land held was uncultivated and for female-headed households, an average of 8% of land held was uncultivated (Spring, 1984, p. 80). Thus, reported figures on *area cultivated* were increased by 6% for female household-heads and by 8% for women residing in male-headed households.

Findings

Table 1 indicates that of farmers reached through Women's Groups, about one-fifth hold less than .5 hectares and over one-half hold less than 1 hectare. Of the female household-heads reached through Women's Groups, about one-quarter hold less than .5 hectares and the very large majority of about fourth-fifths hold less than 1 hectare.

Of the 162 women farmers interviewed, 40% were female household-heads. Of all households in Malawi, reported figures show about one-third are headed by females (NSSA, 1982; Culler, Patterson, & Matenje, 1990). Earlier survey data report the average percent female household-heads in the specific areas and regions surveyed is 36% and 31% respectively (NSSA 1982). This suggests Women's Groups are very effective mechanisms for reaching women farmers who are heads of households.

TABLE 1. CLIENTS REACHED THROUGH WOMEN'S GROUPS BY HOLDING SIZE CATEGORY.

CLIENT HOLDING SIZE CATEGORY	CUMULATIVE % FEMALE HOUSEHOLD-HEAD	CUMULATIVE % FEMALE IN MALE-HEADED HOUSEHOLD	CUMULATIVE % ALL FEMALES IN WOMEN'S GROUPS (N of Cases: 162)
0.0 - < .5	25	15	19
.5 - < 1.0	79	38	54
1.0 - < 1.5	85	56	68
1.5 - < 2.0	93	70	80
2.0 - < 2.5	97	83	89
2.5 - < 3.0	100	94	97
3.0 - > 3.0	100	100	100

Table 2 suggests that of farmers reached through customary extension methods, about one-tenth typically hold less than .5 hectares and about one-third hold less than one hectare. About three-quarters of farmers reached hold less than two hectares.

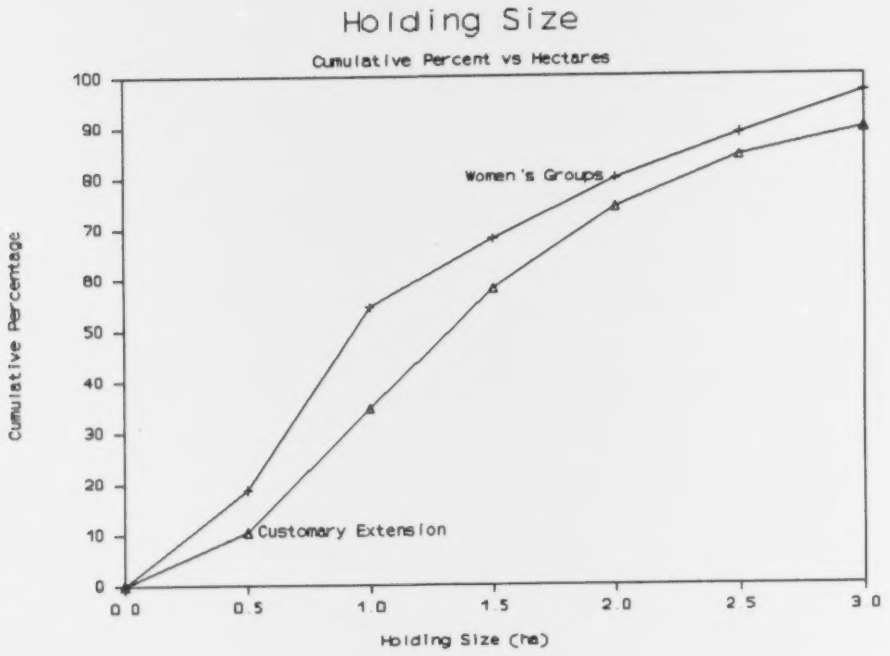
TABLE 2. CLIENTS REACHED THROUGH CUSTOMARY EXTENSION METHODS BY HOLDING SIZE CATEGORY.

CLIENT HOLDING SIZE CATEGORY[a]	% OF ALL FARMERS SURVEYED BY HOLDING SIZE CATEGORY (N of Cases: 5,182)[a]	% OF ALL FARMERS SURVEYED AND REACHED BY CUSTOMARY METHODS BY HOLDING SIZE[b]	CUMULATIVE % OF ALL FARMERS REACHED BY CUSTOMARY METHODS BY HOLDING SIZE[b]
0.0 - < .5	24	11	11
.5 - < 1.0	28	24	35
1.0 - < 1.5	20	23	58
1.5 - < 2.0	12	16	74
2.0 - < 2.5	6	10	84
2.5 - < 3.0	3	5	89
3.0 - > 3.0	7	11	100

Notes:
Customary extension methods defined as: personal visit, field visit, demonstration, meeting, day training course.
[a]Data Source: ASA 1987/88 Worktable 8.3 (unpublished data).
[b]Data Source: based on ASA 1987/88 Worktable 8.3.

Statistical comparison of data in Tables 1 and 2 shows the distributions of land holding size between farmers reached through Women's Groups and farmers reached through customary extension methods are significantly different ($X^2=35$, $p<.1\%$). Proportionately more smallholders are reached through Women's Groups than through customary extension methods. These distributions are shown in Figure 1.

FIGURE 1. DISTRIBUTION OF EXTENSION CLIENTS BY HOLDING SIZE



Differences illustrated in Figure One are largely due to the land holding size of the female household-head members of Women's Groups surveyed. An average of 40% of group members were female household-heads.

Comparatively, while just over one-third of the clients reached through customary methods typically hold less than one hectare, over one-half of clients reached through Women's Groups typically hold less than one hectare. For those extension clients with even smaller holdings (less than .5 hectares), Women's Groups reach about twice the percentage of these farmers reached through customary methods. The point illustrated in this paper is not that Women's Groups reach women farmers. The data could have shown Women's Groups reach the largeholder women farmers. However, the data clearly show Women's Groups are notably more successful than are the customary extension methods studied in reaching smallholder farmers and these smallholder farmers are women.

Discussion

The available data strongly support the premise: Women's Groups are strikingly effective in reaching farmers in the smallholder sector. They also indicate Women's Groups are notably more successful in reaching smallholder farmers than are collectively: personal visits, field visits, demonstrations, meetings, and day training courses. From a policy and resource-investment perspective, the question of whether they are as effective as other group methods currently used in Malawi to reach smallholders deserves further consideration.

Farmer Clubs, traditionally organized to obtain access to and as the primary channel for agricultural credit, are wide-spread in Malawi. Reported figures for 1990/91 show there were about 11,000 Clubs, with members who received agricultural seasonal credit (Chibwana, 1992). Of these members, about 70% were men and 30% were women (Chibwana, 1992). There is little evidence to suggest Farmer Club members are the "smallest of the small" smallholders. To the contrary, Ariza-Nino states: "Members constitute in fact the larger and more progressive farmers in the smallholder subsector" (1991, p. 15). This is confirmed by Koopman who indicates the category of farmers, with over two hectares of land, has nearly exclusive access to credit for fertilizer and improved seeds (1989, p. 6).

The MOA is aware of and actively addressing this situation. In order to expand the reach of extension to a broader farming clientele, current extension policy supports the Block Extension System (BES) of which Women's Groups are a component. BES adapts Training and Visit and organizes farmers based on geographical areas called Blocks. Extension agents, deployed by Block, are expected to meet with both men and women farmers belonging to the particular Block and to demonstrate practices in the Block garden or on farmer fields (Matenje, 1991). Farmers, organized by Blocks, are often referred to as farmers in Farmer Groups/Mixed Groups. Women are encouraged to join these groups. There is currently very limited data available on land holding size of farmers in Farmer Groups/Mixed Groups. To the extent the holding size of clients reached through these mechanisms is reflected in the holding size of clients reached through the customary extension methods of meetings and demonstrations, the available data tentatively suggest Women's Groups reach proportionately more smallholders than Farmer Groups/Mixed Groups. Women's Groups are a component of the BES. Farmers, who are members of Women's Groups, may well be reported as being reached through demonstrations and meetings. However, it does not appear their participation is sufficiently high to substantially influence the proportional distribution of clients reached by land holding size.

Conclusions

In Malawi, utilizing Women's Groups, as a method of extension outreach, substantially increases agricultural extension's chances of achieving its goal of serving the

smallholder farmer. In other African nations, where women farmers are making substantial contributions to agricultural production, where the sociocultural context is similar, and where the policy aim is to target smallholders, organizing and utilizing Women's Groups provides a concrete strategy for policy implementation. Overall, prioritizing investments in the development of Women's Groups is highly likely to pay off and provide highly beneficial returns.

Educational Importance

Further developing the skills, men and women extension staff need to better serve women farmers, will result in improving extension's capability to reach smallholder farmers. This can be accomplished through pre-service and in-service formal and non-formal agricultural education. Skills needed include those required:

- To carry-out gender analysis of farmer activities, resources and constraints, and benefits and incentives.
- To organize and sustain Women's Groups, as a specific extension delivery method.
- To utilize functional teaching techniques for working with women farmers considering their high illiteracy rate.
- To practice professional methods of interpersonal communications between agents and women farmers.
- To understand and to develop appropriate strategies for addressing sociocultural constraints to farmer/agent interaction.
- To apply team building concepts so that men and women agents can effectively collaborate in their work with women farmers.

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Session E

FORMAL EDUCATION CURRICULUM

Paper #1. **COLLABORATING WITH INDUSTRY TO DESIGN AGRICULTURAL CURRICULA: A CASE EXAMPLE FROM JAMAICA**
by
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Louisiana State University

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J. David McCracken, Ana E. Falcon-Emmanuelli and Zakaria bin Kasa
Ohio State University

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Collaborating with Industry to Design Agricultural Curricula: A Case Example From Jamaica[1]

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Introduction

Establishing linkages between education and work is a top priority in the higher education agenda of developing countries. However, in many instances, the interaction between institutions of higher education and key productive sectors of the economy has been minimal to the point where administrators of higher education have not kept in touch with employers to assess the need of the ever-changing job market. Expansion in higher education, therefore, takes place without considering changing national social and economic needs. As a consequence, employers lack confidence in the ability of education institutions to meet their manpower needs. A significant problem created by the situation is quantitative and qualitative mismatches between the output of graduates and the employment market.

The fitness of candidates for a job depends on (a) the requirements of the job, and (b) the qualifications of candidates. To design effective instruction, educators must have confidence in the curriculum that needs to be provided. If the content of job-related curricula is out-moded or irrelevant to market needs, students will not be prepared for the entry-level positions which they have been trained for.

This scenario is reflected in the higher education-work environment in Jamaica. For the past seven years, the College of Agriculture, and prior to that, the Jamaica School of Agriculture, have endeavored to design training programs to meet the employment needs of the agricultural sector. However, no assessment has been made of the relevance of the agricultural curriculum and/or the quality of agricultural graduates vis-a-vis the employment market. The study presented in this paper addressed the former issue.

Purpose of Study

The purpose of the study was to determine the extent to

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[1]Paper presented at the annual meeting of the Association for International Agricultural and Extension Education, Arlington, Virginia, March 18-20, 1993

which the curriculum offered by the College of Agriculture, Jamaica, meets the learning needs of entry-level agribusiness managers based on an analysis of tasks perceived to be important to the job (McKenzie, 1993).

Specific objectives were:

1. to identify entry-level skills perceived to be important for managers of agribusiness firms;

2. to determine differences in perceived importance of skills by type and size of agribusiness firms;

3. to determine the relevance of the curriculum of the College of Agriculture in preparing graduates for entry-level managerial tasks in agribusiness firms.

Methodology

The Agribusiness Management Aptitude and Skill Survey (AGRI-MASS) developed by Litzenberg and Schneider (1987) for doing a national survey of U.S. agribusinesses and also applied in similar studies in Australia (Fairnie et al, 1989) and Canada (Howard, 1989), was chosen for this study.

This instrument requires respondents to rate, on a 10-point Likert-type ascending scale (0-9), their perceptions of the importance of 74 skills, personal qualities and experiences for entry-level agribusiness managerial positions. The scored items are classified into six skill areas, namely; business and economics (20 skills); computer, quantitative and management information (10 skills); technical (9 skills); communication (9 skills); personal qualities (15 skills); and employment, work and general experiences (11).

Information was gathered over a six-week period (September 20 to October 29, 1992) by personal interviews of 122 top and middle-level managers of all agribusiness firms in all fourteen parishes of Jamaica. These firms were identified from the Jamaica Telephone Directory. Four types - marketing, supplies sales, processing, finance - and three sizes - less than 40 employees, 40 to 99 employees, 100 employees and over - were established.

Descriptive statistics were used to compute importance ratings of individual job skills in the skill areas. Analysis of variance was used to compare importance ratings by type and size of firm. The existing curriculum of the College of Agriculture was reviewed and compared with importance ratings to make judgements regarding its relevance to employment needs and to suggest needed revisions. An importance score of 4.0 (slightly below average on the importance scale) or higher was established as the minimum for specific skills to be considered for inclusion in the curriculum

Results and Conclusions

In analyzing the data, 107 interviews were found to be complete; data from 15 interviews were not usable. The respondents were grouped by type and size of firm.

Objective 1

The category of communication skills was rated the most important (Table 1). The order of importance of the other skill areas were: personal qualities; business and economics; technical; employment, work and general experiences; and computer, quantitative and management information.

Overall, 67 (86%) of the specific skills surveyed in the study received importance ratings of 4.0 or higher. Based on this criterion, the data for objectives 2 and 3 were analyzed on these 67 skills.

Table 1

Importance of Agribusiness Skill Areas

Rank	Skill Area	Importance (Least Squares Mean)	Standard Deviation
1	Communication	7.65	.75
2	Personal Characteristics	6.94	.87
3	Business & Economics	5.85	.83
4	Technical	5.31	1.00
5	Work, Employment & General Experiences	5.13	.93
6	Computer, Quantitative & Management Information	2.98	1.87

Objective 2

Set out in Table 2 are data from the analysis of variance on 67 skills within six skill areas by type and size of firm.

(a) Two aspects of communicating technical information - writing and speaking - were perceived to be more significantly important for small and intermediate firms than they were for larger firms, whereas, the ability to give clear and concise instructions, was more important for intermediate firms than for small and larger ones. The relatively high score of 7.0 or higher received by each skill within the area of communication discounts any practical significance in

the differences identified. All nine communication skills met the criterion for inclusion in the curriculum. There was no significant difference in the perceived importance of specific communication skills among the types of firms.

Table 2

Number of Skills Meeting Criterion for Curriculum Consideration and Showing Statistical Significance by Type and Size of Firm

Skill Area	Number of Skills With Scores ≥ 4.0	Number of Skills Showing Statistical Significance ($P \leq .05$)	
		Type	Size
Communication	9	0	3
Personal Qualities	15	2	1
Business & Economics	20	7	10
Technical	9	7	3
Employment, Work & General Experiences	11	3	3
Computer, Quantitative & Management Information	4	3	3

(b) Among personal qualities, the ability to select and supervise employees was perceived to be significantly more important for managers in processing firms than for those in other types, whereas applying technical skills in problem solving was more important to sales and processing firms. The ability to recognize business opportunity was perceived to be more important for small firms.

(c) The abilities to read financial statements, understand accounting concepts, and to identify and manage risk were significantly less important for marketing firms than for other types of firms. Professional selling, human resource management, inventory management, and skills in marketing administration were significantly less important for financial firms than for other types. When the same skills were judged for size of firm, professional selling techniques, inventory management, a knowledge of corporate finance, and the ability to develop business policies and programs were more important to small firms than they were for other firms. A knowledge of marketing administration, domestic and international macro economics, current and

historic international trade, inventory management, and alternative types of business organizational structure were perceived to be less important to large firms than to small and intermediate ones.

(d) Among types of firms, over 75% of technical skills were found to be significantly different. The wide variety of technical skills and the specificity of their application to the different types of businesses could account for the high level of significance perceived among these skills by type of firm. Fewer skills showed significant differences in perception of their importance by size of firm. Food transportation and distribution, engineering technology of production or processing machines, and computer controlled production processes were less important for small firms than for intermediate and large firms.

(e) Among employment, work and general experiences, respondents perceived non-agricultural retail experience to be of less importance to financial firms while previous employment in financial institutions and in developing business plans and organizing business projects were significantly more important for this same type of firm. When the data were analyzed for size of firm, farm work was less important and non-agricultural retail experience and co-operative work experience more important for small firms than for intermediate and larger firms.

(f) Of four computer, quantitative and management information skills meeting the criterion for inclusion in the curriculum, three were significantly more important for financial firms. The same skills were significantly more important for intermediate firms. They were concerned with computer applications in accounting, statistical and mathematical interpretation and managerial decision making.

Objective 3

The curriculum of the College of Agriculture requires students to complete 123 credit units[2] of course work to earn the Associate in Science (A.Sc). This requirement consists of 111 units of core courses and 12 units of electives. More detailed analysis showed that 79 units of core courses and 29 units of electives had instructional objectives analogous to the skills, qualities and

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[2]A credit unit is equivalent to a credit hour in a 16-week semester

experiences identified in the survey. Thirteen units were associated with business and economic skills; 12 units provided instruction in computer, quantitative and management information; 33 units covered training in technical skills; 12 units were associated with communication skills; and nine units provided work, employment and general experiences.

No course was associated with training in personal qualities. However, it was determined that training in several of these qualities was provided by a range of extra-curricular activities sponsored by the College.

The curriculum provides training covering 33 of 67 skills which met the criterion set for considering their inclusion in the curriculum. In addition to all 15 skills related to personal qualities, other skills meeting this criterion but not covered by the curriculum were 6 of 10 employment, work and general experiences. Within the business and economics skill area, professional selling, human resource planning and control, inventory management, and three skills covering aspects of international business and economics were not covered. Under computer, quantitative and management information, skills to use a computerized accounting system and computers in quantitative decision making were not covered. Within the category of communication, training in oral and listening skills which were identified as important, were not offered in the curriculum.

Communication skills and personal qualities were most highly regarded by respondents in firms of all types and sizes. That the addition of more of these objectives or formal courses to provide them would strengthen the present curriculum is apparent. Among the top-rated skills in the area of personal qualities were three personal characteristics, self motivation, business and work ethics, and positive work attitudes. Even though informal teaching is perhaps the preferred approach to meeting these skills, their coverage should be deliberate and intentionally planned. Extra-curricular activities are some of the legitimate informal means of achieving this. The other 12 skills in the personal qualities skill area are professional attributes. These skills and many communication skills may be effectively met if included and reinforced in learning activities throughout the existing curriculum.

It is unlikely that space could be identified within the existing curriculum for new courses to cover instruction in these skills and qualities. However, the evidence of their importance should inspire the teaching staff to plan other ways to accomplish them, such as incorporating learning opportunities within the existing curriculum and developing improved ways of teaching students these and other skills. As an example, members of the teaching staff, assuming the status of role-models, by displaying such

attributes as self motivation, positive work attitudes, high ethical standards, and other personal qualities within their own corporate behavior, will enhance the students' awareness of the importance of these attributes in all the courses, subjects or units in which they are enrolled.

In the business and economics area, specific skills in international trade, export policy and economics were perceived to be highly important. Jamaica's dependence on international trade, participation in international institutions such as the World Bank and GATT, and the international structure and ownership of many agribusiness and food companies in the country are perhaps further confirmation of this importance. On this evidence, the curriculum ought to include an account of international trade and business topics. Similarly, the business and economics area should be broadened to include management of human resources, professional selling and problem-solving abilities in a systematic way.

Within the area of computer, quantitative and management information, skills which combine computer ability with accounting, decision-making and other quantitative skills were highly regarded by respondents. This suggests that the preferred approach to increasing the coverage of computer skills in the curriculum should be by incorporating them in existing accounting, economics, and other quantitative courses.

Strong competition among courses makes it difficult to add new ones to existing curricula. Based on the data, for the College of Agriculture to add new courses or units, the area that might be reduced is that of technical skills. They accounted for a high proportion of the existing curriculum, but the wide variation in importance of specific technical skills puts a limit on their applicability in different sectors.

Educational Importance

(1) One of the starting points for curriculum review is to determine the needs of businesses that employ the graduates of training programs. This study, by its collaboration between industry and the College of Agriculture, provides the COA the initiative to develop in its students expertise for leadership in agribusiness firms. Also, by communicating its technical and personnel requirements, agribusiness gets the opportunity to influence training to match its needs. This should provide confidence in recruitment.

(2) The data acquired in the study should be valuable to the College of Agriculture to review and improve its curriculum, and help students make educational and personal development choices matching the requirements of their careers. The data also show the various

agribusiness sectors to have differing training needs. Combined with other information, such as quantitative need, it is possible for the COA to target specific sectors of the agribusiness industry and design programs that provide the emphases required in those sectors.

(3) Market demand for graduates trained in appropriate skills signifies the need to improve coordination between the business sector and the College. Important skills needed by agribusiness managers have been identified in this study. No attempt was made however to find out the number of jobs in specific agribusiness sectors where future opportunities for employment may exist. Differences in specific skills by these sectors supports the need for additional study to determine specific doctoral needs.

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Preparing African Agricultural and Extension Educators to Meet Future Challenges: An Analysis of University Programs in Kenya, Tanzania, and Swaziland

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Presented at the Annual Conference of the Association for International Agricultural and Extension Education (AIAEE)

March 18-21, 1993
Washington, D.C.

African Countries are Facing an Unprecedented Challenge

There is widespread suffering that has been manifested because of shortages of food in numerous locations on the African continent. Economic, social, and political development must accelerate so that countries may experience an increase in the quality of life that so many are crying for. Expansion of the agricultural sector is essential for the national development of each country in Africa. Even though the ingredients of development; technology, investment, and human resources, have been available in many countries, serious food shortages continue.

A World Bank report (1989) states that sub-Saharan economies must grow by at least 4 to 5 percent annually to achieve food security, provide jobs, and register a modest improvement in living standards. Past performance indicates that this level of minimal achievement may be too ambitious. More people involved in African development are becoming aware that there must be a sustainability to any growth that does occur. Intense efforts must be made to protect the environment, especially in the face of a rapidly expanding population growth.

There is a context of complexity in Africa that has been formed because of the need for increased productivity and environmental protection. Never before has the need for investing in the learning of people been more critical. Even though agricultural and extension education (AEE) has been a priority since independence in most countries, there is now a need to re-examine the adequacy of the training that is being provided. Agricultural leaders must be prepared who can harness the appropriate technology and utilize it in ways that are sensitive to the dynamic human spirit and supportive of a regenerative environment. The task of teaching is important in Africa and there must be a generation of people who are prepared with the best knowledge and skills available. But even more important, Africans must be prepared who can face the problems of the future -- the problems that have not even been articulated today. Students in African universities must be prepared to think critically. They must develop a continuous capacity to learn throughout their lifetimes. The task of "learning about learning" is one that the agricultural and extension education profession should stand up for at this point in time. A new generation of learners must be prepared today. One of the crucial participants in the education task is the African university.

AEE Leaders are Addressing Challenges in Africa

This paper was written by four experienced agricultural and extension educators. Leading educators from Kenya, Tanzania, and Swaziland collaborated with an educator from the United States. The reader is provided with a glimpse of the current reality and future vision of AEE in Africa. To address critical challenges, each educator provides a synopsis of actions being undertaken to improve the programs in agricultural and extension education. Finally, in the last section, the authors offer a glimpse of their vision for the future.

There are Strong AEE Programs in Kenya, Tanzania, and Swaziland

The AEE profession enjoys a rich history in Africa, with certain African countries poised for leadership. Kenya, Tanzania, and Swaziland have positioned themselves as key participants in the agricultural development movements in their respective countries and have assisted with regional development. Most recently, the authors of this paper consulted with officials in Zimbabwe to advise on the start-up of a new BSc option in AEE for the University of Zimbabwe (Steele, Muchena, and Hakutangwi, 1993). Other African countries are also making a significant contribution to the training of agricultural and extension educators. Uganda is re-building its AEE programs at Makerere University. Ghana, Cameroon, Botswana and Nigeria have AEE programs in their national universities. Political instability has affected AEE program

operations in Liberia, Sierra Leone, and Ethiopia, but trained AEE professionals continue to exert their influence and will be available to assist when stability returns.

Agriculture is taught as a subject in all Kenyan primary and secondary schools. It is regarded as a science subject and valued for university admission. In the area or extension, the Kenyan government has adopted the Training and Visit model. Personnel are provided at the National, Provincial, District, Divisional, Locational, and sub-Locational levels. Agricultural education and extension is offered as a program at Egerton University at the Diploma (Agricultural Education), BS (Agricultural Education and Extension), and MS (two options: Agricultural Education and Agricultural Extension) levels. In addition, a general course in agricultural education and extension is offered to all undergraduate students, regardless of the agricultural discipline they have chosen. There are currently no PhD programs in the AEE academic area in Kenya. The AEE academic programs at Egerton University are very popular with students. The biggest constraint to program growth is in limited staffing. Currently, only three faculty members qualified with PhD's in AEE are available to teach, advise, and supervise research for the university, and one of the PhD-holders is only available part-time because of non-academic duties. This staffing complement does not provide Egerton University with the capacity to adequately carry out a PhD-level research program or to do other desired activities, like developing training materials that might support formal and nonformal educational organizations in Kenya.

Since 1974, the BSc curriculum at Sokoine University of Agriculture (SUA) in Tanzania has provided for mild specializations in the third (final) year of study. These specializations, better known as "options", included AEE until recently. Due to a low level of enrollment, the BSc option in AEE has not been offered since 1987. A Department of Agricultural Education and Extension offers courses on aspects of AEE to all BSc (Agriculture) students as well as related courses to BSc (Forestry) and BVM (Veterinary Medicine) students. It is the philosophy of SUA to expose all BSc students to the concepts, principles, and practice of AEE. The Department of Agricultural Education and Extension now concentrates on offering an MSc degree program. AEE Department staff continue to provide service courses for the BSc degree programs in General Agriculture, Home Economics and Nutrition, and Agricultural Engineering that are currently offered in the Faculty of Agriculture. The Department of AEE is well staffed with six PhD holders, each with a capacity to teach at the postgraduate level and supervise thesis research. Other support for AEE comes from staff in the Institute of Continuing Education which has managed to provide an operational link between the university and people in Tanzania communities. The university strives to complement, rather than duplicate or antagonize, the efforts of the governmental extension service. SUA has a unique capacity for research, training, and extension to support and improve government extension personnel. Research outputs from SUA have served as an important input into the extension system. A collaborative mechanism has been put in place whereby the university and government systems dealing with agricultural and extension education work together. The Agricultural and Livestock Policy adopted by the Government of Tanzania recognizes extension as a profession which must be carried out by professionals themselves.

The University of Swaziland provides diploma (associate degree) and first degree (BSc) in agricultural education for those who want to teach at secondary and high schools, vocational institutions, and teacher training colleges. Separate diploma and BSc programs in agriculture include courses in extension education. The emphasis in all programs is on practical agriculture, agribusiness, and research skill development. Entrepreneur training is also emphasized to help students acquire skills for self-employment. An MSc degree in agricultural and extension education is being introduced to serve the needs of Swaziland and the southern Africa region. The AEE program at the University of Swaziland has adequate staff resources for both teaching and supervision of student research.

There is Need for an Increased AEE Role in Africa

There is a clear need for an increased role for agricultural and extension education in African countries. AEE professionals are challenged to establish themselves as leaders in agricultural communities by proactively dealing with emerging issues in a creative manner. Pioneering applications of communication technologies; strengthening the human interface that will allow a balanced strategy of environmental sustainability and increased productivity; and providing learning opportunities for the needs of a rapidly changing clientele are priority areas.

In Kenya, since agricultural technology is spread by personal contact and demonstrations, there must be increased production of resource materials for use by extension workers. Improved use of radio and printed materials such as books, journals, and magazines could increase agricultural technology diffusion, especially to neglected rural areas. With electricity becoming increasingly available in many parts of rural Kenya, films and television could also be used more broadly for extension initiatives. Kenya now puts emphasis on increasing the productivity of arid and semi-arid lands, as opposed to the previous focus of increasing agricultural productivity on high potential rainfed lands. In addition to increasing food production in both crop and livestock sectors, an AEE-led campaign could promote conservation of natural resources and the environment, especially forest and water resource enhancement.

In Tanzania, the changing reality of extension's clientele implies transformation in the work environment of agricultural and extension educators. Hence AEE workers must operate as practitioner professionals who, in essence, must become astute students of their own changing work environment. This is in keeping with the overall agricultural development strategy of Tanzania that seeks to empower peasants to utilize science and technology in farming in order to improve production and incomes. This development strategy will have to be accompanied by improved production of training and extension materials. AEE professionals will be presented with an opportunity to lead the agricultural development movement in Tanzania.

In Swaziland, it is believed that people must learn more about agriculture and that the most capable must be encouraged to take up farming as an occupation. Farmers must continuously learn how to be more profitable. Agricultural and extension educators have a role in monitoring the research activities and serving as advisors to agricultural policy-makers. There are numerous opportunities to provide seminars and workshops for colleagues on teaching methodology in agriculture. Other important roles for AEE include providing leadership for the various agricultural disciplines about how an integrated approach to development can be managed and implemented; pioneering the integration of newer areas of emphasis like gender equity, environment, and population into existing agricultural institutional structures; and conducting outreach activities to assist agricultural institutions in Swaziland, the southern Africa Region, and even internationally.

There are Challenges Involved in Preparing a New Generation

There are a multitude of problems being continuously encountered by African countries. Universities, in particular, are facing issues of attrition that seriously impact their abilities to educate and provide leadership. The problems have been documented and discussed at previous AIAEE conferences (Steele, 1989). The authors of this paper preferred to focus on the challenges available to them and other AEE colleagues in their countries. Career development, new paradigms, and further refinement of the "learning how to learn" approach are the current challenges that are identified and discussed in the remainder of this paper.

How can people be convinced to build their careers in AEE?

A primary challenge in preparing a new generation of agricultural and extension educators relates to how they can be convinced to build their careers in the profession. Historically, the AEE-related jobs in Africa do not pay well. This is true of both agricultural education and extension employment. However, college graduates in AEE have a high rate of employment and job security with government agencies, which is not the case in many other professions. There is also demand among the numerous nongovernmental organizations in African countries for people with the skills acquired by AEE graduates. Even though the AEE program has struggled to gain student enrollment in many countries where it has been introduced, it has enjoyed considerable success in other places. For example, Egerton University in Kenya used to persuade students to select AEE as a major study area for the BSc program but AEE is now experiencing much more popularity and higher enrollments among students. The University of Swaziland has experience similar success in popularity of AEE programs. On the other hand, the Tanzania civil service provides lower incentives to AEE graduates for employment than those provided to other agricultural disciplines. Therefore, Tanzania is concentrating on providing AEE service courses to BSc General Agriculture and on development of strong postgraduate-level AEE programs.

AEE professionals in Kenya, Tanzania, and Swaziland are working to make all sectors of government and private organizations aware of the quality of human resources produced at their institutions. The want to emphasize the extent to which AEE trained people are uniquely capable of tackling a variety of agriculturally related problems. More jobs which specifically require training in agricultural education or extension are becoming available in several countries. This has not been the case until just recently.

How can AEE professionals shift to practicing the new paradigm?

Another primary challenge AEE is facing falls in the areas of sensitizing conventional extension workers towards a new extension philosophy that puts farmers at the center stage and extension workers at the periphery. Tanzania, for example, is re-orienting existing and new staff with a view to enabling them to serve as facilitators of learning, or animators. This new approach is contrasted to the traditional, instructive approach that hands down rules, regulations and recommendations to clientele. Getting policy makers and leaders to understand that extension is facilitated through learning and that learning may take longer to be achieved in some clientele is also a primary challenge. Obtaining adequate funding to support pre-service and continuing education programs still makes the list of primary challenges.

In Tanzania, Sokoine University of Agriculture is struggling to provide re-orientation courses for agricultural and extension educators with a view to facing this challenge. Curricula at Sokoine and other Tanzanian agricultural training institutions are being revised, but often too slow to match changes occurring in the real world of African farmers. The decreased funding pattern for African universities is constraining well-intentioned efforts too.

How can AEE professionals be equipped for continual learning?

The primary challenge for Swaziland is preparing educators to enabling students to "learn how to learn" as new information emerges. There is an issue of whether AEE training should be focused on public sector administrative needs or private sector needs for entrepreneurial skills development. Emerging trends indicate that employment demands created by the public sector are not going to match the output of agricultural educational institutions. Students must also be adequately trained to directly enter farming, if they choose that as a career route. Educating

people who will not be involved directly in agriculture, but who need to know information about the importance of agriculture, is an area that has been almost totally ignored in Swaziland and other African countries.

The University of Swaziland is attempting to make its curriculum more experiential, to promote a problem-solving approach to teaching, and a lifelong learning philosophy. New programs emphasize agribusiness skills, training in simulated work and business environments, revised methods of instruction, short courses in technical and professional areas, and other assistance to increase students appreciation of the principles of agricultural productivity. University of Swaziland internship programs are being strengthened with student attachments not only to government, but to private and parastatal organizations. Postgraduate programs are being introduced with the hope of producing competent researchers and independent thinkers. The programs in AEE emphasize the importance of in-service training. The University of Swaziland is investing in library and communication resources. A distance education institute has just been established to address the issue of learning while one works. Providing instruction through distance education will be important for the development of African AEE. Regional cooperation, similar to recent efforts of the SADC countries, might be crucial for maximization of limited resources. Training in agribusiness might be important too.

In Kenya, Egerton University also pursues practical, hands-on, skill development. Students are exposed to real life situations through a required practicum. There is also an active outreach program through which rural people identify their own needs and formulate solutions. A good example is the participatory rural appraisal (PRA) activity near Lake Nakuru, Kenya. Students from Egerton University work together with the rural population in constructing dams to provide water for livestock, while at the same time collaborating together on strategies for conservation of wildlife through controlled grazing in areas adjacent to a Kenyan national park.

In Tanzania, Sokoine University of Agriculture created the Institute of Continuing Education with a view to providing an opportunity for people of all walks of life to "learn how to learn." A short course in *Administration and Management of Agricultural Extension Services in Africa* is now being offered. The course is targeted for top level administrators and managers of extension services in Anglophone African countries. A start has already been made with initial group of 12 participants from Ghana, Lesotho, Malawi, Namibia, Tanzania, Uganda, and Zimbabwe. Feedback from this initial course offering has been very positive and extension workers who attended are expected to provide critical program leadership in their home countries. A second course will be conducted in 1993. The Sokoine University Teaching and Learning Improvement Programme (UTLIP) is intended to enhance the capacity of lecturers and professors to "learn how to enable others to learn." Student field practicals are included in the curriculum for the same purposes.

We Need a Vision of AEE and its Role in African Development

Agriculture is the mainstay of national economies in Africa. It is still rudimentary, at best, in most countries due to lack of appropriate technology, inputs, adequate knowledge by farmers and villagers, influences of tradition in land tenure, ownership, and decision-making. Above all, agriculture still lacks vigorous support for change from governments, and hence suffers from inappropriate planning, lack of financial resource inputs, active scientific investigation created by brain drain, and lack of collaboration among nation states. Agricultural and extension educators and other scientists must remain in Africa and work towards the course of agricultural development. They must continue to talk to their governments to influence greater financing of agricultural research and continuing education.

In 10-20 years, arid and semi-arid areas of Kenya will be increasingly targeted for intensive agricultural development through introduction of irrigation, adaptable crops, and quality livestock. Presently such areas support nomadic pastoralists without proper planning and control. Agricultural and extension educators will have an opportunity to play a leading role in communicating new or adaptable technology from research, assisting in assessing needs of the targeted populations, and planning new strategies for development. Demand for individuals to take up challenging jobs in these areas has already begun in Kenya and elsewhere. In geographic areas that have already benefited from agricultural development efforts, and in which rainfed agriculture is sustainable, there will be a need to introduce more cost-effective strategies of production that also protects the environment. Agricultural and extension educators can play a leading role by providing continuous information and equipping people to work with clientele at the village level.

The majority of farmers in Tanzania, 10-20 years from now, will have attained at least a primary education. A good number will have acquired a secondary school education or beyond. The next generation of farmers will bring demands that are different from present-day clientele who have very low levels of literacy. Agricultural and extension educators will have to be more innovative and more proactive. The need for prescriptive solutions will have to be obviated in favor of problem-solving capabilities for farmers who must become increasingly problem-oriented rather than subject or discipline-oriented. This implies that practical training for AEE professionals will have to be strengthened. The demand for agricultural and extension advice will increase and hence the need for more qualified field staff. At the same time, AEE must strive to help clientele become "their own extension agents" instead of relying on professionals only.

In Swaziland, there will be an increasing need for people who can establish and operate agricultural businesses, hence the need for entrepreneurial skills. People will need more information about agriculture because there will still be many agribusiness related occupations, with a smaller percentage remaining in farming. Communication with the world regarding agricultural information will be more available, and accessible without delay. People will, therefore, need to be trained in how to consume, analyze, and synthesize information. Agricultural and extension educators will have the responsibility of facilitating, coordinating, establishing cooperation with other institutions, and in providing leadership among their colleagues from other agricultural disciplines.

If African universities can offer a high quality master's degree in agricultural and extension education, other African countries will have a viable alternative to sending student for post-BSc training at western universities. This will serve the purpose of decreasing costs, increasing relevancy, enhancing south-south cooperation, and reducing the likelihood of brain drain. Students may also be more likely to return home after completion of their study programs. The University of Swaziland, Egerton University, and Sokoine University of Agriculture all offer an AEE MSc degree program, with a growing capacity to offer high quality doctoral programs in the future.

There is Reason for Optimism about the Future of AEE in Africa

Kenya, Tanzania, and Swaziland have university programs with well-conceived and operating agricultural and extension education programs. However, each country and its respective agricultural universities are operating under similar economic. social, and political development constraints. In spite of the constraints, each of the three African universities have a well-conceived and progressive vision for the future of agricultural and extension education in their countries and in Africa as a continent.

The articulated vision should be of interest to the international AEE community. Comparison of programs in each of the three countries provides the international AEE community with opportunity to better understand the factors and conditions at work in AEE in these countries, and in Africa as a whole. This can in turn serve as a starting point for an improved operational link between African AEE professionals and their colleagues in the greater international community.

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Role of Vocational Education In The Development of Work Values: A Cross-Cultural Discussion[1]

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Introduction

Far and away the best prize that life offers is the chance to work hard at work worth doing (Theodore Roosevelt in a Labor Day address, Syracuse, NY, 1903). Work-related values are needed for success in chosen careers. Many of the employability skills necessary for employment are value related (Center On Education and Training For Employment, 1992, p. 5). Education that leads to effective work is necessary simply because work is essential to the survival of society. A society without work is inconceivable (Evans & Herr, 1978, p. 85). Vocational education stands *in loco parentis* for teaching the habit of industry, and one of its responsibilities is to develop in students essential work-related values. Among the most important outcomes of vocational education are the values possessed its graduates. The abilities possessed by graduates are the result of a complex interaction of influencing factors. Students have developed their values as a result of home and family, school, religious, and community influences (McCracken, 1990). Therefore, one would expect values to vary among cultures and sub-cultures within and across countries.

Values are beliefs upon which people act by preference. They may be defined as conceptions or standards by which things are compared and approved or disapproved relative to one another. These standards serve as the basis for judging whether something is held to be desirable or undesirable, more meritorious or less, more or less correct. Values are beliefs about desirability.

Vocational educators have primary interest in the values of society and of students relating to work. Pine and Innis (1987) define work values as an individual's needs and priorities and consequent personal dispositions and orientation to work roles that have the perceived capacity to satisfy those needs and priorities. The work ethic represents a set of values related to work. This ethic seems to be used to mean a commitment to work which is stronger than just providing a living (Barbash, 1983, p. 231). It is "a conviction that work is a worthwhile activity in its own right, not merely ... the means to material comfort or wealth" (Lenski, 1961, pp. 4-5). The central premise of the work ethic was that work was the core of the moral life. "Work made people useful in a world of economic scarcity: It staved off the doubts and temptations that preyed on idleness; it opened the way to

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[1]Paper presented at the 1993 Association for International Agricultural and Extension Education Conference, Arlington, VA, March 18-20.

deserved wealth and status; it allowed one to put the impress of mind and skill on the material world" (Rodgers, 1978, p. 14). The work ethic has no fixed definition, but the following key ideas and meanings suggest the ways the concept is used (Barbash, 1983, p. 233): (1) work as an end in itself which is expected to be rewarded eventually with material success; key meanings under this head include the centrality of work, the dignity of work however menial, work as a calling; (2) pride in good quality workmanship, hard work, "an instinct of workmanship," satisfaction in work; and (3) adherence to the discipline of work: punctuality, obedience, diligence, industriousness. The work ethic is therefore a measured commitment to hard work for its own sake, over and above the need to work for money.

Purpose

The major purpose of this paper is to discuss the role of vocational education in the development of work values across cultures. Objectives are to (1) discuss the importance of work values for productive workers in all societies, and (2) examine the role of vocational education in developing work values.

Methods

A literature review was used to develop a theoretical framework of factors believed to be related to work values. Background factors which may influence an individual's work values include: (a) socioeconomic status, (b) sex, (c) ethnicity, (d) subculture (locations of rural, suburban or urban), (e) subculture (religion), (f) subculture (country), (g) parental values, (h) peer group values, and (i) age. Societal factors which may influence an individual's work values include: (a) economic conditions, (b) perception of societal values, and (c) perception of values expected in desired occupations. Psychological factors which may influence an individual's work values include: (a) educational and occupational aspirations, (b) educational and occupational expectations, and (c) religious and moral beliefs and convictions. The authors, who represent different societies and cultures, drew from their experiences to make the discussion practical and relevant.

Conclusions

Work values are important for the development of productive workers in all cultures. Theoretical approaches to the study of values, theories of work motivation, the interrelationship of society and the individual, and the values desired by employers tend to be consistent across cultures.

Theoretical Approaches to the Study of Values

Different researchers have forwarded different approaches for the study of values. Each approach seems to attempt to explain values based upon different influencing factors. In the current experience model (Hoge & Bender, 1974) values and attitudes are not related systematically to the life cycle or to conditions prevailing at any point in the

life cycle. Rather, the current experiences of all age groups are assumed to be affected by social movements and historical events. In the cohort model (Feldman & Newcomb, 1969; Freedman, 1962) certain periods in the life cycle are crucial for the establishment of values. The crucial periods are most commonly seen as the years of secondary education or the beginning college years. These formative years are believed to determine values for life. The life cycle model assumes that the life cycle moves through certain typical phases, bringing about typical value changes. Thus it predicts value change based on developmental stages and ages.

Theories of Work Motivation

Levitan and Johnson (1982) examined explanations for the attachment of people to work. They concluded that work motivation results from the interaction of various possible explanations. Perhaps the most basic theory of work motivation describes the desire to work as part of human nature. The presence of a "work instinct" is impossible to prove, and its strength cannot be measured. However, the desire of most to exert and achieve is difficult to dispute.

The economic explanations for work are familiar ones. The economic advantages of working are almost always sufficient to give individuals powerful incentives to remain employed. In wealthy industrialized nations, the concern for relative income gains is a far more powerful source of work motivation than any basic survival needs. Even amidst considerable wealth, the lure of relative income gains provides meaningful economic incentives to work.

Arguing that work in modern societies is more than a means of subsistence or an avenue for fulfilling economic needs, sociologists have suggested that work is also essential in providing a sense of meaning, of community and self-esteem to the individual. Thus, while people may not want to labor, they usually want a job. The distinction is not merely semantic--few are compelled by the sheer excitement or challenge of their work, but by having a job through which they can earn social acceptance.

Barbash (1983) suggested that work ethic precepts are best cultivated, not by preaching moralism and ideology, but by structuring the employment bargain so as to create a reciprocity between the work ethic's precepts on the one side, and humane management and "fair day's pay for a fair day's work" on the other. In a society's "value system," the work ethic has to "pay off," and not necessarily in monetary terms alone, or it has little standing (p. 259).

Interrelationship of Society and Individual

Pine and Innis' (1987) review of the literature on cultural and individual work values indicates that economic patterns in society and the values embedded in those patterns have a profound influence on individual work values. When society is prosperous, jobs are plentiful, and the economy is booming for sustained periods of time, higher order values centering on social concerns, beauty, service to others, and

self-actualization dominate. In an unstable economy characterized by financial uncertainty and job insecurity, survival values dominate. There is a strong reciprocal relationship between economic conditions and individual work values (p. 285). Such a relationship seems to be self-evident. Yet, theories and studies of vocational development and career planning place almost an undue reliance on the psychology of individuals. Little attention is given to the economic and societal forces that shape individual work values and career choices.

There seems to be general agreement that work serves three fundamental functions in life: economic, social and intrapsychic. Whichever function receives the greater importance in the research may simply be a matter of who ask the questions rather than who answers them. Future studies of individual work values need to focus on the complexities of the reciprocal relationship between cultural and societal values and individual work values (Pine & Innis, 1987, p. 286).

The commitment to work values becomes more difficult as (Barbash, 1983): (1) an affluent society raises work expectations, (2) employment in the service sector outruns employment in production, (3) populations with weaker work ethic commitments become proportionately more numerous, (4) a welfare state increases non-work options, (5) the distances between order-givers and order-takers and between job and end-product widen, and (6) public attitudes denigrate menial work (page 258).

Values Desired By Employers

Employers in all cultures have been very concerned about the work values of their potential employees. They are looking for people who possess basic skills, good native language and mathematical skills, and the ability to communicate and translate information to and from customers. They want their workers to be productive, have the ability to work effectively with others, and possess a knowledge of the basic structure of industry and commerce (Dean, 1981). Basic categories of values desired by employers include (Buck & Barrick, 1987): being honest, having good self-esteem, having a positive self-image, having personal and career goals, exhibiting good attitude, working well with peers, being friendly, being consistent in their relations with people, accepting assignments pleasantly, being tactful, accepting all types of people, respecting the rights and property of other people, completing work on time, accepting responsibility, being willing to perform extra work and work overtime, showing pride in their work, being punctual with a good attendance record, viewing work as more than a job, exhibiting loyalty to the organization and its employees, and showing concern for their future career with the organization.

Individual components of the work ethic (Addrisani & Parnes, 1983) typically include beliefs about the moral superiority of hard work over leisure or idleness, craft pride over carelessness, sacrifice over profligacy, earned over unearned income, and positive over negative attitudes toward work. Perhaps most importantly, the variety of attitudinal questions almost always includes beliefs about the extent to which hard work leads to success (p. 102). The strength of individuals' commitment to the work ethic affects various measures of their success

in the labor market, even as favorable labor market experiences have feedback effects on the extent to which individuals are committed to the work ethic (p. 115). Research findings suggest that strength of commitment to the work ethic is an important element in conditioning successful adaptation to the labor market by both younger and older workers of both sexes (p. 117).

Many people have seldom seen beyond the economic dimension of work. Throughout their lives, the messages they have received about work from family, friends, fellow workers, and even supervisors has been a negative one. They have, understandably, not looked to the workplace to offer anything more (p. 16). The necessity to perceive work in a positive and meaningful way is central to one's personal and occupational success (Kraska, 1990). In fact, a study conducted by Kazanas and Wolff (1972) noted that cognitive and psychomotor skills may not be as important for job survival as positive work values (p. 27).

Educational Significance

Work values influence economic productivity of individuals and families worldwide. Values relating to work have become an integral part of the vocational education curriculum.

Japan

In Japan, the Fundamental Law of Education, 1947, defines the central aim of education as the full development of personality, striving for the rearing of people, esteeming the value of the individual, respecting labor and having a deep sense of responsibility, and being imbued with an independent spirit, as builders of a peaceful state and society. Moral education in schools is actually integrated throughout all educational activities. First, it is given through the teaching of a subject known as Moral Education which has been allocated 35 hours a year.

Students also learn values through Social Education. Social Education is a term used for organized educational activities other than those provided in the school curriculum. These activities are carried out in diverse ways on the basis of people's voluntary and spontaneous desire for learning. Major public facilities for social education include citizen public halls, public libraries, museums, youth houses and children's centers. Youth houses and children's center are the facilities that really help develop positive work values in students. By participating in the activities at the youth houses, young people are given an opportunity to develop self-discipline, cooperation, friendship and social service. They are also encouraged to develop a sense of solidarity, and to enhance their general culture and physical fitness. Activities conducted in the Children's Centers include: (1) nature study and other activities for making children familiar with nature; (2) outdoor activities such as camping and orienteering; (3) productive work such as manual work and growing trees and plants; and (4) training programs for leaders of children's organizations, for staff at facilities for non-formal education of young children, and for other people

concerned with education of children. The youth houses and the children's centers are operated either by the national local government.

The United States of America

In the United States schools have been somewhat reluctant to specify values as objectives. There is a concern that students should be free to select and possess whatever values they desire. There is little in the literature which actually describes the work values and attitudes that teachers teach and the teaching methods/methods techniques that they employ to teach them. However, Gregson (1990) concluded that instructors directly and indirectly teach numerous types of work values and attitudes to their students. The most emphasized cluster of work values and attitudes included being: ambitious, cooperative, helpful, accurate (quality of work), dependable, reliable, responsible and dedicated, devoted, honest, loyal, and conscientious.

The instructors reported using several different pedagogical strategies to teach work values and attitudes. The most frequently identified pedagogical strategies were reward structure, group discussion, one on one counseling, role modeling, and role playing. The majority of the instructors taught work values and attitudes incidentally with cognitive and psychomotor skills,using both democratic and indoctrination pedagogical techniques extensively. Wayne and Chapman (1992) recommended the following strategies/techniques to help instill the work ethic: (1) return assignments promptly since promptness is an important part of the work ethic; (2) help students, through example, to learn the difference between a day's work for a day's pay and just putting in eight hours; (3) help students develop concern for people; (4) design curricula and courses with success in mind, since successful experiences in the classroom will lead students to repeat desired behavior; (5) design courses so each component has an absolute relationship to the real world. (6) require students to choose objectively between conflicting needs rather than allowing them to make choices based on what others want; (7) use visual aids to teach abstract qualities such as tact, trustworthiness, dependability, diplomacy, and loyalty; (8) videotape students to emphasize appropriate business dress and grooming and to reinforce good enunciation, pronunciation, grammar, pitch, and tone; (9) use bulletin boards to help students develop pride in their works, displaying a picture of the student of the week, excellent work, or memorable quotes about the value of quality work; (10) use news stories that directly relate to work, work attitudes, work ethics, job satisfaction, and work behavior as a springboard for class discussion; (11) use newsletters and other media to publish information about school programs and student achievements; (12) use simulations to develop a spirit of cooperation and teamwork, responsibility, the necessity of accuracy, the satisfaction of completing assignments that meet business standards, and the wise utilization of time; (13) encourage students to become involved in student organizations as a workshop for understanding human relations, promoting citizenship, instilling occupational pride, developing desirable traits through experience, and promoting respect for hard work and healthy competition; and (14) teach work ethics through a variety of assigned written and oral communication activities (p. 141). Vocational youth

organizations such as the FFA have been designed to develop values relating to leadership, career development, citizenship, cooperation, thrift, and scholarship.

Malaysia

One of the objectives of vocational schools is "to develop skills, work habits, attitudes and responsibilities in students so that they can be employed on a useful and productive basis" (TVED, 1988). In order to achieve this objective, the Ministry of Education has explicitly stated in the school curriculum more than 20 values that have been commonly accepted by all races in the country. The teaching of these values is not only on the shoulders of vocational teachers but also on the shoulders of all the teachers. In other words, the teaching of values, including work values, should be done by every teacher regardless of the subject he/she teaches. Among the values that have been listed in the school curriculum include: respect of others, independence, self-esteem, love and belonging, freedom, being brave, cleanliness, trustworthness, honesty, loyalty, responsibility, dedication, reliability, helpfulness, being hard working, cooperativeness, being able to solve problems, entrepreneurship, following instruction, and social service.

Challenge

If vocational education is to have an impact in preparing students for the workplace of the future, an important consideration will be whether the curriculum can have an impact in the development of values needed by employers and by societies. Research based upon this and other theoretical frameworks is needed to provide a sound foundation for this future curricula designed to develop desirable work values.

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Session G

INTERNATIONALIZING DOMESTIC PROGRAMS

Paper #1. **GLOBAL ISSUE - IDENTIFYING EXISTING ATTITUDES OF AGRICULTURAL AND METROPOLITAN LEADERS**
by
Barbara G. Ludwig
Ohio State University

Paper #2. **INTERNATIONALIZING AGRICULTURAL CURRICULA: ARE WE TEACHING THE CONCEPTS IN OUR SECONDARY SCHOOL AGRICULTURAL PROGRAMS?**
by
Don O. Ibezim, J. David McCracken, and Janet L. Henderson
Ohio State University

Paper #3. **PERCEPTIONS OF YOUNG FARMERS REGARDING THE ROLE OF INTERNATIONAL AGRICULTURE IN AGRICULTURAL EDUCATION**
by
Kamal Ali Elbasher and Robert A. Martin
Iowa State University

BEST COPY AVAILABLE

GLOBAL ISSUES: IDENTIFYING EXISTING ATTITUDES OF AGRICULTURAL AND METROPOLITAN LEADERS

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Viewed from outer space, most of the earth's surface is covered by water. No lines mark national or political boundaries and weather patterns shift without regard for religion, language or race. Yet, on earth, the perspective is altered. People tend to view "their" country as the center of the universe. (Tiedt & Tiedt, 1990). For most people in the world, direct experience with other countries and cultures is infrequent or nonexistent. Even in the U.S., with its geographically mobile society, there is a tendency to stay within our own communities and circle of acquaintances. America 2000 (1990) targets the need for an educated citizenry having the knowledge and skills to compete in a global economy. It states "all our people, not just a few, must be able to think for a living, adapt to changing environments, and to understand the world around them... We must realize that education is a lifelong pursuit" (U.S. Department of Education, pg. 35).

A study of Extension Director's in 1990 by Poston and O'Rourke indicated that clientele attitude was a key factor acting as a barrier to the globalization of Cooperative Extension programs and activities. The study identified the need for educational programs, especially those provided to clientele groups, as being necessary for globalization. Results of a 1989 Ohio State University study of Extension faculty and staff (Ludwig, 1989) produced similar results. Ohio personnel indicated a desire for in-service education related to increasing global understanding, global marketing and development, but identified one of the major barriers to internationalizing Extension in Ohio as the attitude of local clientele.

Extension prides itself on developing educational programs in response to the needs and interest of people. Skinner (1991), in an address to the American Home Economics Association, noted that in a world which is increasingly interdependent, we do ourselves and our clients a disservice if we do not prepare them for an increasingly internationalized society and economy. Skinner reaffirmed concepts outlined in Global Perspectives for Extension (U.S.D.A., 1989).

A review of literature revealed little was known about the attitudes of leaders in Ohio which help to shape their global perspectives. A need to study citizen attitudes toward other cultures, the global market place and development issues was identified. Surveying leaders from both traditional agricultural constituency and Extension's growing metropolitan clientele was identified as one way to better understand citizen attitudes towards global issues. Now that this information has been gathered, curriculum development and staff in-service education can be based on identified needs rather than assumptions.

PURPOSE AND OBJECTIVES

The purpose of the study was to identify the attitude of Ohio agricultural and metropolitan leaders toward four international dimensions.

Objectives:

1. To ascertain the attitude of Ohio leaders toward third world development and poverty.
2. To ascertain the attitude of Ohio leaders toward international trade.
3. To ascertain the attitude of Ohio leaders toward other cultures.
4. To ascertain the attitude of Ohio leaders toward involvement of Extension in global education.
5. To describe differences in attitude that exist among the groups sampled.

PROCEDURES

Population

The target population consisted of three strata of Ohio citizens: (1) county agriculture leaders, (2) state level agriculture leaders and (3) metropolitan leaders. A sample of 385 (Krejcie & Morgan, 1970) was identified using a proportionate stratified random sampling technique to allow a 5% margin of error in estimating the mean attitude score for each dimension. Names were secured from College of Agriculture faculty at The Ohio State University in May of 1991, assuring an up-to-date listing.

An accessible population of 1427 names was received and duplicates removed. The frame included: 361 county agriculture leaders (25%); 687 metropolitan leaders (48%); and 388 (27%) Ohio agriculture leaders. The sample of 385 consisted of 96 (25%) county agricultural leaders; 185 (48%) metropolitan leaders and 104 (27%) Ohio agriculture leaders.

Instrumentation

A mail questionnaire, titled "Global Issues for Ohio's Citizens" was developed. A five point, Likert-type scale was used to measure attitudes on four dimensions: (1) third world development and poverty, (2) international trade, (3) sensitivity to other cultures, (4) Extension involvement in global education. Respondents were asked to identify whether they: (1) strongly disagree, (2) disagree, (3) agree, (4) strongly agree or (5) don't know how they feel about a series of statements on the topic. Only the numbers 1-4 were used in calculating the scale values. Negative items were reverse coded so the dimension could be summated.

An open-ended question requested additional comments on Extension incorporating global concepts into educational programs. Respondent personological information including: age, gender, level of schooling completed, birth in the United States, ethnicity, language proficiency (other than English) and time spent outside of the United States was collected.

Content validity was established by a panel of experts from the College of Agriculture at The Ohio State University. The questionnaire was pilot and field tested, to help control measurement error, using leaders who had not been selected as a part of the sample. Reliability for the instrument was .87 as measured by Cronbach's alpha. This met criteria (Nunnally, 1967) established for reliability (internal consistency).

Data Collection and Analysis

The questionnaire and a personalized cover letter were mailed to identified leaders in June, 1991. Questionnaires were coded to identify early and late respondents among county agricultural leaders, Ohio agricultural leaders, and metropolitan leaders and to assess non-response error. An introductory post card and three follow-up mailings to encourage returns from non-respondents were used.

Non-response error was assessed using late respondents (n=42) as a surrogate for non-respondents (Miller and Smith, 1983). Using a t-test at the .05 alpha level, no significant differences were found between early (n=264) and late respondents' domains of interest. Therefore, results can be generalized from the sample to the accessible population.

RESULTS

Three hundred sixteen (82%) of the questionnaires were returned; 306 were usable. Responses were coded for computer analysis using SPSS. A .05 level of significance was established *a priori*. Descriptive statistics were used. Of the total respondents, 91 (30%) were county agriculture leaders, 133 (44%) were metropolitan leaders and 80 (26%) were Ohio agricultural leaders. Returns closely approximated the proportions in the population.

Background Demographics

Occupations varied with the largest single group being agribusiness (25%). Seventeen percent of the respondents identified themselves as farmers, 17% as educators, 18% as agency professionals and 10% as business persons.

Forty percent of the respondents were between 40 and 50 years of age, 23% were under 40 and 36% were 50 or older. Results indicate that 71% of the respondents were men and 27% women. Most (96%) were born in the United States, but 78% of the respondents had visited another country and 61% of these had made their visit within the past 10 years. Forty-five (14.7%) were proficient in a language other than English.

The groups surveyed were well educated and traveled with 98.7% completing high school and 91.4% attending college or going on to earn an advanced degree. Twenty five percent had obtained post graduate degrees. Seventy-two percent read a daily newspaper, 40% watched world or national news on television daily.

Findings

As reported in Table 1, respondents showed the most positive attitudes toward cultural sensitivity as measured by the questionnaire. Slightly less positive attitudes were shown toward third world development, Extension involvement in global education and international trade.

Strongest agreement was noted with statements which: acknowledged respondent's ability to learn from other cultures and countries; valued citizen exchanges between countries; indicated Extension had a role to play in educating farmers and agribusiness owners about global markets; global issues and third world development; and saw Extension staff needing additional training, particularly related to global markets.

Strongest disagreement was with statements that: American farmers did <u>not</u> need education on global issues; global interdependence is a myth; a major obstacle to economic development in poor countries is people who do not work hard; U.S. responsibility extends only to its own farmers; and foreigners in the U.S. were taking jobs from U.S. citizens. See Tables 2, 3, 4, & 5.

Of those responding to the open ended question (n = 114), "Comments on Extension staff incorporating global concepts into their educational programs", 56% were supportive, 20% were negative and 24% offered mixed reactions. Metropolitan leaders were more positive in their comments than Agricultural leaders toward Extension internationalizing.

<u>ANOVA</u> was used to determine differences among the three target groups on each dimension. Statistically significant differences ($p<.05$) were found between groups on each dimension. A Scheffé *post hoc* test was used to identify where significant differences occurred between groups. In all instances, the attitude of county agricultural leaders was less positive than metropolitan leaders or agricultural opinion leaders. Table 6 reports the results.

<u>Attitude Toward Third World Development and Poverty</u>. The mean score of all groups was 2.88 (SD=.39) which would be between disagree and agree, but closer to agree. County agricultural leaders varied significantly ($p<.05$) from metropolitan leaders and agricultural opinion leaders relative to their attitudes toward third world development and poverty. The attitude of agricultural leaders was less positive than metropolitan leaders or agricultural opinion leaders. Metropolitan leaders showed the most positive attitude of all groups with a mean score of 2.95 (SD=.36) which would be between disagree and agree, but almost at the agree score.

<u>Attitude Toward International Trade</u>. The mean score for all groups was 2.77 (SD=.44) which would be between disagree and agree, but closer to agree. County agricultural leaders exhibited a significant ($p<.05$) difference from metropolitan leaders and state agriculture opinion leaders. In both instances, county agricultural leaders showed a more negative attitude.

Metropolitan leaders' attitude was the most positive of the three ($\bar{X}$ = 2.86, SD =.48), but did not vary greatly from Agriculture Opinion Leaders' ($\bar{X}$= 2.84, SD=.5). Both scores were between disagree and agree, but closer to the agree.

Attitude Toward Other Cultures. The mean score for all groups on this dimension was 3.07 (SD=.37) which would be between agree and strongly agree, but closer to agree. There was no significant difference between metropolitan leaders and agricultural opinion leaders on this dimension. A significant ($p<.05$) difference was noted between county agricultural leaders and metropolitan leaders. County agricultural leaders were less positive in their attitudes.

Attitude Toward Extension Involvement in Global Education. The mean score of 2.90 (SD = .40) would be between agree and strongly agree, but almost at agree. Metropolitan leaders were significantly ($p<.05$) more positive in attitude ($\bar{X}$ = 3.03, SD = .32) toward Extension's involvement in global education than county agricultural or state agricultural leaders.

Table 1
Attitude of Ohio Leaders Toward Global Issues

DIMENSIONS	MEAN	STANDARD DEVIATION
1) THIRD WORLD DEVELOPMENT/POVERTY	2.88	.39
2) INTERNATIONAL TRADE	2.77	.44
3) SENSITIVITY TO OTHER CULTURES	3.07	.37
4) EXTENSION INVOLVEMENT IN GLOBAL EDUCATION	2.90	.40
OVERALL (1, 2, 3 & 4)	2.91	.31

Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly Agree

Table 2
Attitudes of Ohio Citizens Toward Third World Development and Problems

Item	Percent					$\bar{X}$ SD
	SD	D	A	SA	NR	
In the poorest countries of the world, agricultural growth will be necessary to provide the poor with more purchasing power.	2.0	7.8	53.9	30.7	5.6	3.20 .65
One of the major obstacles to economic development in poor countries is that there are too many people who do not work hard enough. (R)	29.1	44.1	12.7	3.6	10.5	3.10 .75
Third world countries will be important customers for U.S. agricultural products in the 1990's.	2.9	12.4	51.6	25.8	7.2	3.08 .70
Increased agricultural production in third world national has coincided with an increase in their demand for agricultural imports.	2.3	15.7	43.1	8.2	30.7	2.82 .56
U. S. agricultural assistance to third world countries creates new competition and undercuts American farmers in the international market. (R)	9.8	56.2	18.3	7.9	7.8	2.74 .73
Trying to help starving people in the world is counterproductive because so much of the food we give never reaches the people in need.	13.4	42.8	26.5	8.8	8.5	2.67 .81
The solution to the world hunger problem to severely limit population growth in third world countries. (R)	10.8	38.6	26.5	12.4	11.7	2.54 .83

Scale: 1= Strongly Disagree; 2= Disagree; 3= Agree; 4= Strongly Agree; NR = No response
R = Reverse coded for data analysis

Table 3
Attitudes of Ohio Citizens Toward International Trade

Item	Percent					$\bar{X}$ SD
	SD	D	A	SA	NR	
Small and medium sized American businesses can become effective participants in global markets.	1.0	12.4	54.2	25.5	6.9	3.12 .64
U.S. responsibility extends only to its own farmers. (R)	20.9	60.8	12.4	5.9	0	2.97 .76
We must stop giving away America's technology to other countries. (R)	15.4	52.0	20.5	7.2	4.9	2.79 .78
In the future, the U.S. government should not assist countries in producing agriculture commodities if those same countries are producing commodities which compete with the U.S. on world agricultural markets. (R)	7.2	48.4	24.5	7.5	12.4	2.63 .71
If the U.S. helps other countries grow more agricultural products, those countries will import fewer agricultural products from the U.S. (R)	6.9	45.4	30.7	4.6	12.4	2.62 .66
One of the main U.S. agricultural problems is that we have too many cheap, subsidized foreign agricultural products flooding the U.S. market. (R)	9.1	35.0	27.5	11.1	17.3	2.51 .78

Table 4
Attitudes of Ohio Citizens Toward Other Cultures

Item	Percent					$\bar{X}$ SD
	SD	D	A	SA	NR	
Citizens exchanges between countries improve the ability of participants to understand and care about how other people live.	.3	1.3	61.8	34.3	2.3	3.33 .51
American farmers do not need education from Extension on global issues. (R)	34.6	52.9	4.3	3.3	4.9	3.25 .68
We can learn from the culture and technology of other countries.	0	1.6	70.3	26.5	1.6	3.25 .47
Global interdependence is a myth.	27.7	48.4	11.8	2.0	10.1	3.13 .68
The large numbers of foreigners in the U.S. are a primary reason for the high jobless rate among American citizens.	24.8	59.5	9.5	6.2	0	3.03 .77
Our customs, beliefs and values should be used as models by other countries. (R)	17.7	52.6	13.7	4.2	11.8	2.94 .69
Citizens of the United States are ignorant about world affairs.	3.9	27.1	44.4	19.0	5.6	2.83 .77
Getting to know people of another culture is a good idea, but little ever comes of it. (R)	15.0	47.1	27.1	3.9	6.9	2.78 .73

*Scale: 1= Strongly Disagree; 2= Disagree; 3= Agree; 4= Strongly Agree; NR = No response
R = Reverse coded for data analysis

Table 5
Attitudes of Ohio Citizens Toward Extension Involvement in Global Education

Item	Percent					$\bar{X}$ SD
	SD	D	A	SA	NR	
Extension should develop programs to educate America's farmers, agribusinesses and rural leaders about competing in global markets.	2.3	5.6	52.6	35.9	3.6	3.27 .66
Extension staff should receive training to become more knowledgeable about global marketing.	2.6	5.9	63.1	23.2	5.2	3.13 .62
Extension staff in Ohio have a role to play in helping clientele understand global issues.	1.9	4.6	60.0	16.3	8.2	3.09 .53
Extension can help Ohio citizens understand rationale for supporting agricultural development in third world countries.	2.9	7.2	62.7	20.3	6.9	3.08 .62
International study tours sponsored by Extension would increase clientele awareness of global issues.	1.3	8.2	76.1	14.4	0	3.04 .53
Involvement of Extension staff in third world development projects can improve their ability to help local clientele.	4.2	14.4	58.2	13.7	9.5	2.90 .67
Extension staff should not be involved in helping third world farmers improve production practices. (R)	19.6	50.0	17.3	7.5	5.6	2.87 .81
Extension county agents do not have the expertise to help clientele understand global interdependence. (R)	4.9	25.2	33.0	7.8	29.1	2.39 .65
Extension staff should focus on local problems. (R)	5.5	34.0	41.5	10.5	8.5	2.38 .73

Scale: 1= Strongly Disagree; 2= Disagree; 3= Agree; 4= Strongly Agree; NR = No response
R = Reverse coded for data analysis

Table 6
ANOVA: Attitudes Toward Global Dimensions

	Third World Development/ Poverty		International Trade		Sensitivity to Other Cultures		Extension Involvement in Global Education	
Groups	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
County Agriculture Leaders (n=91)	2.73[ab]	.38	2.59[ab]	.45	2.97[a]	.35	2.77[a]	.42
Metropolitan Leaders (n=133)	2.95[b]	.36	2.86[b]	.38	3.14[a]	.37	3.03[ab]	.32
State Agriculture Leaders (n=80)	2.92[a]	.39	2.84[a]	.48	3.06	.35	2.83[b]	.44
Source	df	F	df	F	df	F	df	F
Main Effects	2	10.07*	2	10.07*	2	6.40*	2	13.71*

*p<.05 a,b - means with common superscript differ significantly

CONCLUSIONS

Overall, the groups targeted for study were positive in their attitude toward global issues, but not strongly so, Metropolitan Leaders exhibited the most positive attitude toward all four international dimensions studied. County agricultural leaders were significantly ($p<.05$) more negative than Metropolitan Leaders in attitude toward: third world development and poverty, international trade, sensitivity to other cultures, and Extension involvement in global education.

County agricultural leaders were the most negative of the three groups targeted for study in attitude toward all four international dimensions studied. County agriculture leaders were significantly ($p<.05$) more negative than state level agricultural leaders on attitude toward third world development\poverty and international trade. Both county and state agriculture leaders were less positive about Extension involvement in global education.

The groups surveyed were well educated and traveled with 98.7% completing high school and 91.4% attending college or going on to earn an advanced degree. Twenty-five percent (25%) had obtained post graduate degrees. Seventy-seven percent (78%) had traveled outside the United States and 71% read a daily newspaper.

County agricultural leaders, Ohio agricultural leaders and metropolitan leaders studied expressed the attitude that America's farmers, agribusinesses and rural leaders need education about competing in global markets. Respondents indicated we can learn from the culture and technologies of other countries and felt citizen exchanges between countries improved the ability of participants to understand and care about how other people live. Attitudes expressed indicate Extension has a role to play in helping clientele understand global issues, global marketing and the role of agriculture development in third world countries.

EDUCATIONAL SIGNIFICANCE

Each day evidence is found reinforcing the importance of understanding ourselves and others. Individual choices impact the global village we inhabit. This applies to decisions at all levels: economic, political and social. Interdependence is no longer a matter of belief, preference or choice. It is an inescapable reality (Harris & Moran, 1987).

Contemporary people learn about their world primarily through information systems. Information travels rapidly by way of television, radio and other communications devices. The media, coupled with experience, socialization, and nonformal and formal educational systems all contribute to an individual's global perspective -- a blend of many things that shapes how an individual views and interacts with his or her world. As a nonformal education system, Extension must view itself as part of an information system that can impact people's view of the world. Extension needs to collaborate with other public and private organizations to address global issues and facilitate lifelong learning.

Extension can to educate staff and clientele regarding global issues and the many interrelationships which exist. A priority should be placed on integrating international perspectives into current domestic programming and materials. However, making education everyone's responsibility often means that no one feels empowered to act. The Ohio Extension International Committee in cooperation with Extension administration and College of Agriculture administration will need to take programming initiative.

The study indicated global marketing and international trade should be targeted for emphasis and reinforced ES-USDA recommendations in Going Global (1989). With GATT and North American Free Trade Agreements soon to be implemented, a teachable moment exists. Extension staff, if adequately prepared, can help the public understand how the global marketplace functions and how the economic health of the U.S. agriculture community is connected with international development. Through staff development activities and tours, Extension staff can become more familiar with new technology developed abroad and how this can be adapted to benefit American agriculture or the consumer.

Traditional county agricultural constituency in Ohio may require curriculum designed to broaden their understanding of third world development. An increasing awareness of environmental issues, water supply and human nutrition issues are examples of areas where relevant global education curriculum can be developed.

The demographics of the U.S. are changing and clientele is increasingly diverse. Understanding and sensitivity to the unique needs of other cultures will be essential in designing and carrying out effective programs in the future. Extension needs to become proactive in incorporating opportunities for citizens of different cultures to meet and exchange ideas. This may mean travel or better utilization of visiting students, scholars and foreign nationals living within local communities.

Finally, the results while not generalizable beyond Ohio, can provide Extension leaders in other states insights into possible clientele reactions and may stimulate further study. Further study regarding the current attitude, level of global awareness and competency of Extension staff to incorporate global concepts into educational programs, curriculum and materials is needed.

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Internationalizing Agricultural Curricula: Are We Teaching The Concepts In Our Secondary School Agricultural Programs?

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Introduction

One major challenge facing agricultural educators in the next decade will be how to address the issue of the growing global interdependence (McCracken, 1990). Many voices have expressed a concern that schools have not been recognizing the global demands which would be expected of citizens in the future. According to Hemp (1980), the practice of basing agriculture courses of study entirely on local farm practice and preparing students for employment in the local community is no longer a defensible approach to the development of agricultural education programs in secondary schools. The International Committee on Organization and Policy (1990) observed that students studying a local curriculum cannot compete effectively in the global arena, a situation that does not bode well for the productivity and competitiveness of the United States agricultural industry.

White (1990) noted that internationalizing the curriculum sparked the interest of students, revitalized programs, and provided students with a more comprehensive view of agriculture. The ultimate competitiveness of U.S. agriculture in the global arena will depend upon the availability of individuals who know and understand the global nature of the agricultural enterprise (International Committee on Organization and Policy, ICOP, 1990). It has become clear that for a student to be considered educated in agriculture, he or she must be cognizant of the interrelationships of various agricultural systems and the governments, cultures and societies in which they function. It is no longer sufficient to know how to produce food and fiber and carry out the operations in today's agricultural industry (Martin, 1990).

Several factors have been identified as related to the implementation of an educational change. Educators who were involved in international programs tended to have a more positive attitude about international educational programs (Reaman & Etling, 1990), and were more likely to integrate international concepts into their curricula than those without such experience (Pause & Swanson, 1980; Reisch, 1989). Reisch further stated that the key elements affecting the internationalization of the agricultural curriculum in primary and secondary schools were the teachers knowledge of international aspects and awareness of global interdependence and cultures of other people.

Paper presented at the 1993 Association for International Agricultural and Extension Education Conference, Arlington, Virginia, March 18-20.

Teachers may lack the knowledge base to know what to teach about international agriculture and may also lack understanding of how to make such instruction relevant. Successful implementation of international agriculture would require both affective and behavioral changes in teachers.

Fullan (1982) indicated that active administrative commitment and leadership at the school level, knowledge of the innovation, attitude, quality and frequency of collegial interaction among educators, and the availability of validated resource materials are necessary for successful implementation of an educational innovation. Lack of appropriate instructional materials limits the growth and development of global education. Pierce (1981) reported that young teachers with higher levels of formal education were more likely to implement educational innovations.

Teachers of agriculture (Kellogg, 1984) have a responsibility to present educational information from a perspective which explicitly takes into account the international and foreign dimensions of agriculture. Agricultural teachers have demonstrated favorable attitudes toward international agricultural programs (Hossain & Moore, 1992; Ludwig, 1991). However, high school students continue to have a limited awareness of international concepts (McCracken, 1990; Harbstreit & Welton, 1992). Research was needed on the extent of integration of international agricultural concepts and the factors influencing integration efforts. The results of this research effort should be helpful to agricultural educators involved in internationalizing their agricultural instruction.

Purpose and Objectives

The major purpose of the study was to examine the extent to which international agricultural dimensions were taught in secondary agricultural programs in the North Central Region of the United States and to determine factors related to the extent of integration. The following research questions were used to guide the study:

1. To what extent are international agricultural concepts taught in secondary agricultural programs?

2. What is the level of teacher knowledge and attitude concerning the internationalization of the agricultural curriculum?

3. To what extent is the educational system committed to teaching international concepts?

4. To what extent can the degree of internationalization of the curriculum be explained by other factors

Methodology

Design. A descriptive research design with a correlational component was utilized. Relationships among natural occurring phenomena were described and the extent of internationalization of international concepts was predicted from other variables included in the study.

Population And Sample. The population was the 2,612 secondary school agricultural teachers in the 12 states of the North Central Region: Illinois, Iowa, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The population was identified from the Agricultural Educators Directory for 1991-92 academic year. A systematic sampling method, with a sampling interval of eight, with a random start was utilized to draw a representative sample of 332 agricultural teachers. Under these conditions there was a 95% probability of a sampling error of less than 0.07 on the 5-point Likert-type scale used to measure the dependent variable.

Instrumentation. Likert-type summated scales were developed to measure the extent of integration, cultural awareness, attitude toward international agriculture, and institutional commitment variables. Knowledge was measured by a series of true or false cognitive statements. Content validity was established by a panel of experts consisting of graduate students and faculty members from The Ohio State University. Twenty agricultural teachers from the population who did not participate in the study were used for a pilot test. Cronbach's alpha yielded reliability coefficients ranging from .63 to .94.

Data Collection. A questionnaire packet with a cover letter was mailed in May of 1992. After the initial and follow-up mailing and a postcard reminder, a 15% random sample of non-respondent was interviewed. Comparisons were made between respondents and non-respondents and between early and late respondents. There were no statistically significant differences between either of the groups, therefore, one can generalize from the respondents to the sample and to the population. The overall response rate was 70% (n=231); however, only 66% (n=220) of the responses were usable.

Data Analysis. The study utilized the descriptive statistics of frequencies, means, percentages and standard deviations. The Pearson-product moment correlation coefficient and Kendall's Tau C were used to determine the strength of relationships between variables. Semi-partial and stepwise multiple regression analyses were used to identify specific independent variables which contributed to variance in the extent of integration of international concepts score.

Results

The typical teacher was a 35 year old male who had been teaching for over 10 years and had either a Master's or Bachelor's Degree. Seventy percent of the agricultural teachers taught in schools located in rural areas.

Nine different international agricultural dimensions were used to measure the extent of integration of international concepts. Overall, 58% of the teachers reported they taught international agricultural concepts in their classes. Table 1 shows the rank order and mean scores reflecting the extent of integration of the various international agricultural dimensions. On a 5-point scale (1 = never taught, 5 = always teach), the most integrated international concept in secondary agricultural classes was the origin of crop dimension with a mean of 3.2. Agricultural

technology, agricultural trade, and geographical factors received a mean score of 2.9. International agricultural practice was the least taught international concept (mean = 2.2). The overall mean score on the extent of integration was 2.74 (standard deviation = .67). The states of Ohio, Wisconsin, Missouri, Illinois, Indiana, and Kansas scored above the overall mean of 2.74, while Michigan, South Dakota, North Dakota, Iowa, Nebraska, and Minnesota scored below the overall mean.

Table 1

Rank Order and Mean Scores Reflecting the Extent of Integration of International Agricultural Dimensions (n=220)

International Agricultural Dimensions	Rank	Mean	S. D.
Origin of Crops	1	3.2	1.1
Agricultural Technology	2	2.9	1.0
Agricultural Trade	3	2.9	1.1
Geographical Factors	4	2.9	1.2
Economic Factors	5	2.8	1.0
Political Factors	6	2.8	1.1
Consumption of Food and Fibre	7	2.7	1.0
Cultural Factors	8	2.4	0.9
Agricultural Practice	9	2.2	0.9

Measured on a 5 point scale; 1 = never, 2 = really, 3 = sometimes, 4 = frequently, 5 = always. Overall Mean = 2.74, Standard Deviation = .67.

Teachers knowledge was measured on six different dimensions of international agriculture. Teachers scored at 88% on the agricultural technology dimension, 77% on agricultural trade, 70% on agricultural practice, 52% on agricultural production and food consumption, and 49% on the origin of crop dimension.

A large proportion (92%) of the respondents expressed a high degree of awareness for cultural differences among people. The overall mean for the construct "cultural awareness" was 4.98 on a 6-point scale (1 = strongly disagree, 6 = strongly agree). The standard deviation was .53.

Eighty-three percent of the teachers expressed positive attitudes towards integrating international agricultural concepts into their agricultural program. The overall mean score for this construct was 4.47 on a 6-point scale (1 = strongly disagree, 6 = strongly agree). The standard deviation was .66. Eighty percent of the teachers indicated they were committed to making their agricultural program more internationally focused.

A 6-point scale (1 = strongly disagree, 6 = strongly agree) was used to measure perceptions of the commitment of others regarding the internationalization of the curriculum. The mean scores were: teacher commitment, 4.39; state department of education commitment, 4.71; school commitment, 1.25; and principal commitment, 1.31.

On a 5-point scale (1 = never, 5 = always), the mean scores for utilization of selected instructional materials ranged from 2.76 for visual materials (slides, video tapes) on international agriculture to 1.50 for student activities on global perspectives. On a 6-point scale (1 = of little importance, 6 = highly important) teachers rated text and reference books highest for obtaining information about international agriculture with a mean score of 4.0. Mass media, curriculum material services and individual contact with other teachers received a mean score rating of 3.9. The Cooperative Extension Service (mean = 3.7) was rated above their State Department of Education (mean = 3.6) and National Task Force on International Agriculture (mean = 3.0).

Relationships. Low positive relationships, significant at the .05 level, were found between extent of integration and the number of years teachers taught agriculture (r = .15), age of teacher (r = .11), level of formal education (r = .17), knowledge of food consumed in other countries (r = .12), cultural awareness (r = .23), teacher attitude (r = .27), teacher commitment (r = .14), state department of education commitment (r = .11), and school commitment (r = .29). School location (rural vs. urban) and principal commitment were unrelated to the extent of integration of international concepts. Teachers with greater extent of integration of international concepts tended to rely on the following sources of information: Cooperative Extension Service (Tau = .15), mass media (Tau = .24), text and reference books (Tau = .17), curriculum material services (Tau = .23), and personal contact with other teachers (Tau = .24). They also tended to utilize the following instructional resource materials in teaching: basic curriculum guides on international dimensions (Tau = .25), student activities on global perspectives (Tau = .16), resource people (Tau = .32) and visual materials (Tau = .34).

Regression Analysis. A semi-partial multiple regression analysis was calculated to determine the amount of variance explained in the extent of integration score by three sets of independent variables. The three demographic variables, the two international experience variables, and the 13 work-related variables that were significantly related to the extent of integration comprised the variable sets. Table 2 indicates that only the demographic and work-related variable sets explained a statistically-significant unique portion of variance in the dependent variable. The work-related variable set explained over one-fourth of the variance in the dependent variable (sR^2 = .279). The total R^2 was .40.

A stepwise multiple regression was performed to determine the combination of variables that could best predict the extent of integration of international concepts. Variables found to predict integration of international concepts were: visual materials on international agriculture (X_1), attitude toward integration of international concepts (X_2), use of basic international agriculture curriculum guides (X_3), use of mass media (X_4), and level of formal education (X_5). As a group these five

variables explained 35.5% of the variance in the dependent variable. The equation for estimating extent of internationalization was:

$$\hat{Y} = .32X_1 + .19X_2 + .21X_3 + .18X_4 + .14X_5 + .453.$$

Table 2

Semi-Partial Multiple Regression Coefficients for the Variable Sets

Variable Sets	K_A	K_B	sR^2	F
Demographic Variables	15	3	.024	2.67[1]
International Experience	16	2	.014	2.35
Work-Related Variables	5	13	.279	7.12[2]

$R^2 = .40$; [1]$p < .05$, [2]$p < .001$, (df 18, 199)
K_A = # of variables controlled, K_B = # of variables in set

Conclusions and Significance

Findings of this research were generally consistent with previous research on the adoption of innovations with one notable exception. Older teachers were more likely to adopt internationalization than were younger teachers. It may be that awareness of and interest in global agriculture increases with age. Therefore, older and more experienced teachers may be more likely to adopt this innovation.

Teachers perceiving strong state department of education support for internationalizing the curriculum were more likely to adopt this curriculum change. It appears that state departments can influence innovation with necessary leadership activities. Such leadership activities might include inservice education, provision of instructional materials, and suggested changes in curriculum priorities.

Teachers' positive attitude towards the integration of international concepts may predispose the extent to which they integrate international agricultural dimensions in their classes. It appears that agricultural teachers who exhibit higher degree of cultural awareness would be more likely to internationalize their agricultural instructions. Conversely, teachers who lack awareness of other peoples' culture may not be interested or even resist internationalizing their agricultural instructions.

In addition to the quantitative data many teachers provided comments, both positive and negative, about internationalizing the curriculum. Some teachers felt that a better job of preparing students with non-agricultural backgrounds for agricultural jobs should have a priority over internationalizing the curriculum. Others felt that the current curriculum was already too packed with material to add something additional. The nature of favorable comments was that internationalizing the curriculum would assist in expanding the base of interested students,

in assisting future agriculturalists in expanding agricultural exports, and in preparing students for global careers.

Based upon the findings of this research, the following variables appears to be the most significant factors contributing to the extent of integration of international concepts: utilizing visual materials on international agriculture, a positive attitude towards integrating international concepts, utilizing basic international agriculture curriculum guides, mass media as the most important source of information, and level of formal education.

Further research is recommended to develop and test curriculum materials, prioritize possible curriculum content, establish data about the need for a global dimension in agricultural occupations, and determine the interest and knowledge of agricultural students about international concepts.

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Perceptions of Young Farmers Regarding the Role of International Agriculture in Agricultural Education

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Paper Presented At:
The Association for International Agricultural and Extension Education (AIAEE). Ninth Annual Meeting.
Arlington, Virginia. March 19, 1993.

Perceptions of Young Farmers Regarding The Role of International Agriculture In Agricultural Education

INTRODUCTION

Wood and Rosati (1990) stated that increased emphasis has been placed on a component of the curriculum concerning the study of non-western cultures in American institutions of higher education. This study emphasis is justified based on the fact that the "globe" is figuratively becoming a smaller place to live and work. Greater awareness of the whole globe is important as trade relationships take American farmers into the global market.

An understanding of international agriculture is critically important to every one who works in the agriculture sector. A high degree of knowledge is requisite for future workers in the agriculture sector and a thorough understanding of world agricultural issues is no less important to those who seek careers in agriculture (Wood and Rosati, 1990). The need for an awareness of the global nature of the agricultural industry has become one of the major needs of our time. It has become increasingly apparent that if a person is to be considered educated in agriculture, he/she must be cognizant of the interrelationships of various agricultural systems and governments, cultures and societies in which they function. No longer it is sufficient to know how to produce food and fiber and conduct or manage the many tasks in today's agricultural industry (Martin, 1989).

Historically, the guiding purpose for vocational education in agriculture in the U.S. has been "to train present and prospective farmers for proficiency in farming" (Meaders, 1990, pp 2). The attainment of this aim was said to involve an understanding of problems of production and marketing of products on a local, state, national, or international basis. In addition, the aim included the study of relationships of the farm home, community service, and leadership.

Judging by the lack of volumes of research about young and adult farmers' education and recent studies indicating a lack of emphasis on adult education (Pfister, 1983; Miller et al., 1983; and Woodin, 1967, in Martin and Bia, 1986), it would appear that young and adult farmer education is not a high priority of the agricultural education profession. Agricultural and extension educators have at various times expressed the feeling that young farmers have been a neglected group regarding the provision of opportunities for participation in organized programs to improve proficiency (Oparaugo, 1980 and Smith, 1980, in Martin and Bia, 1986). However, in recent years, many questions have been raised regarding the need for adult and young education delivered through vocational agriculture departments as well as concern about the focus of these programs. In a study of educational programs for young and adult farmers, Martin and Bia (1986) found that while there was a general recognition for the need to help young farmers, they did not find a single study regarding the role of international agriculture in agricultural development and education as perceived by young farmers in Iowa. Since young farmers are an important part of the agricultural community, their perceptions toward the role of international agriculture must be identified. These perceptions can be assessed through the current agricultural education programs being offered to young and adult farmers in Iowa.

The cognitive information concerning the international agricultural technologies that farmers possess has not been widely investigated. Nor has the literature revealed any studies concerning the relative understanding of these issues. It was with these concerns in mind that this study was conducted. This study serves as a basis for revision of present agricultural education programs and could provide a basis for the development of new educational programs in international agriculture at secondary and post-secondary educational institutions. Also, it is anticipated that the findings from this study will serve as important reference materials to students who may be interested in doing further work in this area. A study of this nature is useful in bringing about a clear understanding of the importance of the role of international agriculture in development and education in Iowa, and could have implications for educational programs in other states (Martin, 1989).

PURPOSE AND OBJECTIVES

The primary purpose of this study was to identify and assess international agricultural knowledge and skills needed by Iowa young farmers. A secondary purpose was to determine their perceptions regarding international agriculture issues and how agricultural education and extension systems could enhance a global agricultural awareness among Iowa farmers. Specific objectives were: 1) to identify the importance of selected topics related to international agriculture, 2) to identify the level of interest of Iowa young farmers in studying selected topics in international agriculture, 3) to identify perceptions held by Iowa young farmers regarding selected issues in international agriculture, and 4) to compare topic area importance, educational interest levels and perceptions based on selected demographic data.

METHODS AND PROCEDURES

The study was conducted using the descriptive survey method. The term "descriptive research" represents a broad range of activities that have a common purpose of describing situations or phenomena (Mason and Bramble, 1978). These descriptions may be necessary for decision-making or to support broader research objectives. Descriptive research is also used to describe the characteristic of Iowa young farmers as learners, and supply information on their perceptions regarding selected issues in international agriculture. The population included all members of the Iowa Young Farmers Educational Association (IYFEA). The 1991 membership was about 200 young farmers (IYFEA, 1991). The final list of members consisted of only 158 members who qualified for this study. The basic development of the survey instrument was based on an adaptation of questionnaires used by other researchers (Omer, 1987). Four major areas and thirty-five related topics were identified. Respondents indicated the degree of importance and level of interest regarding each topic on a five-point Likert scale ranging from one (not important/no interest) to five (very important/very interested). They indicated their perceptions regarding selected issues in international agriculture on a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree). Data collection was accomplished through the use a mail questionnaire. The questionnaires were mailed out together with a cover letter explaining the purpose and the need for the study. Follow-up letters were mailed three weeks later and phone calls were made to ten randomly selected nonrespondents to assess any differences in responses compared to the individuals originally responding. There were no significant differences between these responses and those of the original respondents.

Of the 158 young farmers in the population, 51 responded to the initial mailing. Through the follow-up procedures, an additional 35 questionnaires were returned for a total response of 86 questionnaires or 54.4%. Of the 86 returned questionnaires, there were 78 usable survey forms. The final response rate of 54.4% was considered to be adequate given the fact that, traditionally, farmers do not respond well to surveys (Lasley, 1985 and Howe, 1981).

ANALYSIS OF DATA

Because the study involved the use of the total population, it was decided that descriptive statistics would be the most appropriate for data analysis. The data were compiled and coded onto a WYLBUR file and analyzed using the updated version of the Statistical Package for the Social Sciences (SPSS, 1983). The data were analyzed to meet the specific objectives of the study.The data were analyzed using means, standard deviations, frequencies and percentages. Cronbach's Alpha reliability coefficients were determined for each of the major three scales as follows: importance scale was 0.94, interest scale was 0.96, while it was 0.70 for perception scale. The coefficient values were deemed to be sufficiently high to proceed with analysis and interpretation. According to Nunnally (1982), an alpha greater than 0.65 is the minimum recommended for research purposes.

RESULTS

Objective one of this study was to identify the importance of selected topics related to international agriculture as perceived by Iowa young farmers. It was observed that two topics in livestock production received a rating of four or above. The remaining topics in livestock production were rated between 2.67 and 3.44. Five topics in crop production received a rating of 3.50 or higher. The remaining topics in crop production were rated between 2.99 and 3.36. It was also observed that topics related to livestock, crop production, and agribusiness education such as marketing, pests and diseases, crop pesticides, new crop varieties and chemical safety problems in other countries received the highest ratings in the four broad areas (Tables 1,2,3 &4). The findings suggested that most of the topics in the four broad areas were confirmed by the respondents to be important. As a group, they rated most of these topics three or above, a rating of "some" or above in the importance scale. The relatively low rating of selected topics in horticulture such as landscaping and turf management was observed in this study (Table 3). These findings were consistent with a report indicating that the low ratings in horticulture topics may be due to lack of knowledge concerning these topics and/or a lack of emphasis on these topics in the educational program (Omer,1987).

Objective two of this study was to identify the level of interest in studying selected topics in international agriculture as perceived by Iowa young farmers. The level of interest in studying selected topics in international agriculture indicated the highest rated topic was "marketing of livestock production" (3.97), followed by health and diseases, breeding and reproduction, production management, and feeding system. Interest in crop production topics produced data which indicated five topics received a rating of three or above. These were as follows: (1) new crop varieties, (2) pests and diseases, (3) pesticides, (4) marketing systems and (5) crop production management in other countries (Tables 1,2,3 &4). The results of interest ratings in horticulture were relatively low. These results were consistent with the earlier report by Omer (1987). The general agriculture topics which received 3.5 and above were: government programs, government regulations, agricultural credit, and natural resources (Table 4). On most of the topics in the four broad areas the respondents were between "interested" and "somewhat interested" (3 or above) in studying international agriculture related topics. This finding reflected that most of the topics in the four areas were confirmed to be of interest to the respondents. Three significant differences were found in the level of interest in program areas in international agriculture when the respondents were compared by the type of farmer (full-time vs. part-time). The differences were detected at the .05 level concerning agricultural topics in crop production, horticulture, and general agriculture (Table 5). In each of these topic areas, part-time farmers indicated higher levels of interest in international agriculture as related to these topics than full-time farmers.

The third objective of this study was to identify perceptions held by Iowa young farmers regarding selected issues in international agriculture. The respondents were asked to indicate to what extent they agreed or disagreed with fifteen statements concerning international agriculture issues in providing assistance to young farmers. The statements were rated on a five-point scale where one indicated a maximum degree of disagreement and five indicated a maximum degree of agreement. The general perceptions of farmers included a strong indication for some form of a global outreach program in agricultural education. The six highest perception statements dealt with this issue. The preference was for educational programs offering some international agricultural topics. The low ranking of the statements "even if agricultural training were offered, agricultural practices would not change" and "U.S.A. farmers have no need for international technical knowledge" could be interpreted in a positive manner. The relatively low ratings suggested disagreement with both statements which mean that there was a potential that agricultural practices could be improved with the introduction of international agriculture training programs and U.S.A. farmers could learn some international technical knowledge which might help in crop and livestock production (Table 6). The low rating of perceptions regarding job and business

opportunities in agriculture in other countries indicated a lack of confidence in, but perhaps not a firm attitude toward, present level of economic activity in agriculture (and perhaps economic development in general) in the world. In summary, the findings show that the respondents were, in general, between "neutral" and "some" agreement regarding the perception statements on international agriculture issues.

Table 1: Importance and level of interest in selected topics in livestock production in international agriculture as rated by Iowa young farmers

Topic	Importance		Interest	
	Mean	S.D.	Mean	S.D.
Marketing of livestock	4.60	0.96	3.97	1.02
Health and diseases	4.01	0.87	3.29	1.08
Breeding and reproduc.	3.44	0.88	3.19	1.16
Use of computer	3.19	1.01	2.83	1.05
Production management	3.10	0.92	3.04	0.97
Feeds and feeding	3.04	0.90	3.00	1.06
Production records	2.86	0.94	2.76	0.93
Record keeping	2.76	0.99	2.68	0.97
Group Summary	3.37	0.90	3.09	1.03

Scale: 5= very important/interested; 4= important/interested; 3= somewhat important/interested; 2= of little importance/interest; 1= not important/no interest.

Table 2. Importance and level of interest in selected topics in crop production in international agriculture as rated by Iowa young farmers

Topic	Importance		Interest	
	Mean	S.D.	Mean	S.D.
Importance of pests and diseases	4.32	0.80	3.51	1.02
Crop pesticides	3.64	0.94	3.33	1.03
Marketing of crops	3.63	0.91	3.28	1.04
New crop varieties	3.63	0.88	3.51	1.05
Chemical safety	3.56	0.97	3.06	1.06
Crop Prod. Management	3.36	0.90	3.17	1.05
Soil fertility	3.13	0.99	2.87	1.01
Crop prod. records	3.04	0.97	2.77	0.98
Use of computer	2.99	1.12	2.81	1.08
Group Summary	3.48	0.94	3.15	1.03

Scale: 5= very important/interested; 4= important/interested; 3= somewhat important/interested; 2= of little importance/interest; 1= not important/no interest.

Table 3. Importance and level of interest in selected topics in horticulture in international agriculture as rated by Iowa young farmers

Topic	Importance		Interest	
	Mean	S.D.	Mean	S.D.
Fruit production problems	3.10	0.98	2.34	1.12
Vegetables produ. problems	3.09	1.00	2.36	1.08
Landscaping problems	2.23	0.96	2.01	1.02
Turf management problems	2.16	0.86	1.86	0.85
Group Summary	2.64	0.95	2.14	1.01

Scale: 5= very important/interested; 4= important/interested; 3= somewhat important/interested; 2= of little importance/interest; 1= not important/no interest.

Table 4. Importance and interest in selected topics in general agriculture in international agriculture as rated by Iowa young farmers

Topic	Importance		Interest	
	Mean	S.D.	Mean	S.D.
Government programs	3.96	0.89	3.62	1.04
Water quality	3.94	1.02	3.45	1.16
Natural resources	3.92	0.91	3.50	1.13
Government regulations	3.90	0.88	3.59	1.09
Air quality	3.90	1.06	3.37	1.15
Agricultural credits	3.73	0.91	3.53	1.05
Leadership in agriculture	3.68	1.06	3.31	1.10
Human relations in agri.	3.60	1.00	3.17	1.10
Financial planning	3.51	0.96	3.22	0.98
Wildlife management	3.44	1.08	3.13	1.04
Taxes	3.37	0.94	3.14	1.04
Decision making process	3.28	0.88	3.05	0.95
Land tenure systems	3.13	1.05	3.01	1.04
Computer use	3.12	0.99	2.90	1.04
Group Summary	3.61	0.97	3.29	1.06

Scale: 5= very important/interested; 4= important/interested; 3= somewhat important/interested; 2= of little importance/interest; 1= not important/no interest.

Table 5. A comparison of the level of interest regarding selected topic areas in international agriculture when Iowa young farmers are grouped by full-time and part-time farmers

Topic Area	Type of Farmers: Full-time Farmers n	Mean	S.D.	Part-time Farmers n	Mean	S.D.	t-value	prob.
Livestock Production	59	2.99	.78	15	3.39	.84	-1.75	0.085
Crop Production	59	3.03	.79	15	3.50	.74	-2.10*	0.039
Horticulture	58	1.95	.82	15	2.61	1.09	-2.59*	0.011
General Agriculture	59	3.17	.83	15	3.75		-2.51*	0.014

*Significant at .05 level.

CONCLUSIONS

Based on the findings, the following conclusions can be made:
(a) as a group, farmers participating in the study were highly educated, their income was fairly high, most were full-time farmers, and the majority were between 20 and 39 years of age. These findings are important for agricultural educators who need to be responsive to the needs of Iowa young farmers when educational and training programs are being developed; (b) farmers indicated that most of the selected topics related to international agriculture in the four broad areas were important. They perceived the importance of topics related to livestock and crop production and agribusiness education such as marketing, pests and diseases, new crop varieties and chemical safety problems in other countries, as the highest ratings in the four broad areas; (c) farmers were primarily interested in international agriculture topics which dealt with livestock production, crop production, general agriculture, and horticulture, in descending order; (d) the general perceptions of the farmers included a strong indication for some form of a global outreach program in agricultural education and extension; (e) most of the observed differences involved part-time farmers who indicated higher levels of interest and perceived some statements related to international agriculture significantly higher than full-time farmers; (f) farmers rated international agriculture topics related to environment (government programs, government regulations, water quality, natural resources, air quality, etc.) fairly high on the importance and interest scales.

RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations were made: (1) agricultural education should be delivered with a global perspective throughout the state of Iowa to meet the needs and interests of local agricultural producers. (2) educational programs should be planned and/or revised for present and future young farmers to emphasize the international agriculture topics with highest priority (i.e. marketing, new varieties,...etc.). (3) agricultural education should initially focus on approved basic practices in other countries which deal with environmental issues. (4) agricultural education should offer educational programs including farmer exchange programs to help farmers understand and learn more about international agriculture. (5) this study supports more international content in education programs, therefore, topics related to international agriculture should be taught in schools and colleges. (6) various variables need to be considered in planning programs in international agriculture, e.g., type of farmer and the planning involved.

Table 6 Means, standard deviations, and rankings on the level of perception of Iowa young farmers regarding selected issues in international agriculture

	Statements	Rank	Missing Cases	Valid Cases	Mean	S.D.
1	The U.S.A. produces high quality crop and livestock compared to most international producers.		0	78	4.13	.87
2	International farmer exchange programs will encourage farmers to learn about international agriculture.		0	78	3.80	.81
3	International agriculture educational programs should be offered to help understanding of current international market trends.		0	78	3.73	.85
4	Consider adopting new agricultural practices used by farmers in other countries.		0	78	3.72	.77
5	Educational programs for farmers should offer some international agriculture topics.		0	78	3.72	.72
6	High school and college students should study agricultural topics related to intn'l. agriculture.		0	78	3.71	.79
7	Agricultural educators must try to give examples from other countries' agricultural production systems along with the U.S.A. system.		1	77	3.69	.82
8	Consider travelling to other countries to visit farmers.		0	78	3.65	1.04
9	Agricultural training should include some information of agricultural products from other countries.		0	78	3.64	.82
10	The U.S.A. should protect farmers by restricting the importation of agricultural products from other countries.		0	78	3.60	1.19
11	International agriculture programs should be offered in order to understand problems that farmers face in other countries.		0	78	3.49	.81
12	There are many business opportunities in agriculture in other countries.		0	78	3.46	.91
13	There are many job opportunities in agriculture in other countries.		0	78	3.35	.94
14	Even if agricultural training was offered related to international agriculture, agricultural practices would not change.		0	78	2.60	.93
15	U.S.A. farmers have no need for international technical knowledge in crop and livestock production.		0	78	2.00	1.07

Scale: 5=strongly agree; 4=somewhat agree; 3=neutral; 2=somewhat disagree; 1= strongly disagree.

EDUCATIONAL IMPLICATIONS

High priority ratings for the importance and interest in topics related to livestock, crop production and agribusiness education such as marketing, pests and diseases, and new crop varieties in other countries reflect the current situation among the members of IYFEA. This finding is consistent with a study conducted by Omer (1987) in which he studied the farmers' use of extension. This finding will motivate agricultural educators to plan and/or revise current educational programs to emphasize the international agriculture topics with highest priority. The general perceptions of these young farmers included a strong indication for some form of a global outreach program in agricultural education. This finding is significant because it represents a strong support for the new approach of "internationalizing the curriculum". The data also indicate that part-time farmers consider travelling abroad to visit farmers and training programs in international agriculture as a trend among Iowa farmers because of their current involvement in such different international agricultural trade agreements (e.g. Russia, Japan, etc.). Finally, the data indicate that Iowa young farmers want more international agriculture education and they are willing to participate in any educational programs dealing with this issue.

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Session H

METHODS OF DISSEMINATING INFORMATION

Paper #1. **ACCESS TO INFORMATION: LIBRARY SUPPORT FOR INTERNATIONAL DEVELOPMENT**
by
Anne Fox and Peggy Johnson
Oregon State University

Paper #2. **CONSTRAINTS TO AND THE POTENTIAL OF INDIA'S FARM SCIENCE CENTERS AS RURAL INSTITUTIONS FOR AGRICULTURAL AND RURAL EDUCATION AND DEVELOPMENT**
by
V.G. Dhanakumar
University of Wisconsin-Madison

Paper #3. **THE POTENTIAL CONTRIBUTION OF MARKETING CONCEPTS FOR IMPROVING THE EFFECTIVENESS OF INTERNATIONAL DEVELOPMENT EXTENSION EDUCATION PROGRAMS**
by
C. Ben Tyson
University of Connecticut

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ACCESS TO INFORMATION:

LIBRARY SUPPORT FOR INTERNATIONAL DEVELOPMENT

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Introduction: Libraries can strengthen international development programs, but may often be included as an afterthought. Consultants from the U.S. or international scholars returning home may arrive at an overseas university and find the library facilities to be insufficient for their needs and the in-country faculty/researchers to be without access to important published information in their respective fields. A library component may hastily be added to the project after the fact. Here at home, international development offices also overlook their local university libraries as important sources of information, consultation, and a wide array of useful services.

Purpose: The purpose of this paper is to present our philosophy concerning access to information for researchers in developing countries and to describe two examples of this philosophy in action in programs through the university libraries of Oregon State University and the University of Minnesota, St. Paul Campus.

Philosophy, issues, methods: First let us state our underlying three-part philosophy.

(1) ACCESS TO INFORMATION: Students, educators, and researchers in developing countries would benefit greatly from having access to current information in their fields: journal articles, conference proceedings, experiment station bulletins, international research center reports, FAO documents, to name a few.

(2) SKILLS TO LOCATE INFORMATION: Library research skills are needed to make good use of the literature and should be taught in conjunction with providing access.

(3) SUSTAINABILITY: When provided with the proper skills and access, these researchers will be empowered to work independently, exploring the literature on their own, and thus have greater control over the direction of their research and the development of their country.

Now let us present two examples of libraries and international development working well together. The first example shows what can be done on campuses here at home and the second example describes library consultants at work in a developing country.

Oregon State University Libraries

The Oregon State University Libraries (OSU) have a specific professional position titled the International Programs Librarian. According to a recent survey we conducted of university libraries in the U.S. and Canada this position is quite unique. Of the 178 respondents who were asked "Does your university have an office of international research and development, sometimes called international programs?" 120 or 67.4% answered yes and of the responding land-grant schools 91.1% said yes. But when asked if there was a specific librarian on their staff who acted as a liaison to that office 85% said no and even 80% of the land-grant schools said no. When asked if their library had a professional position relating specifically to international services, not just international development, but any or all international services, 89% said no and 91% of the land-grant schools said no.

Other aspects of the survey touched on services related to international projects, students, scholars, etc. and libraries did fare better here. When asked "Does your library provide services to international projects overseas?" 64% said yes, "Specific tours and instruction for international students?" 67% answered yes, Library orientation for visiting scholars?" 50% responded yes. When asked if they designated funds in their materials budget specifically for collections relating to international research and development needs, a much smaller number, 21% said yes.

Two general questions in the survey asked about the emphasis placed on internationalizing their universities and their libraries. Two thirds (65.7%) said there was either much more or somewhat more emphasis to internationalize their campus and half (48.6%) said the same for their libraries. Overall, the survey shows a growing awareness that we are part of a global community, but what university libraries see as their role in supporting international development is less clear.

With this increasing emphasis on moving toward the international campus, librarians do have an important role to fill as active participants in this movement. The OSU International Programs Librarian supports international activities is a variety of ways. This person fields special requests for materials and online searches by the Office of International Research and Development or the Office of International Education staff, provides library orientation and research assistance for international scholars and

graduate students, and aids in preparing library components for development proposals. Library linkages have been established between OSU and libraries in Malawi, Bangladesh and India for document delivery.

In order to effectively perform these duties the librarian must learn the demographic profile of the foreign students and visiting scholars on one's campus, their countries, languages and fields of study. In addition one must become familiar with the overseas development projects, faculty on assignment abroad, and the international research and development staff on campus.

Once the librarian is familiar with the institution's international activities, s/he can begin by promoting existing library services such as general reference services, document delivery, interlibrary loan, tours, seminars, and database searching. The librarian can also provide special information promptly upon request to the office of international research and development staff. The OSU Libraries' experience is that this staff is working under greater pressure and meeting many more deadlines than most academic departments and thus service must be adjusted to their special needs. By working closely with this staff the librarian can identify what will be most useful. Maybe it's giving advice on CD-ROM hardware or database selection, or purchasing two or three books on a specific country or subject in a hurry or gathering articles for a project director going overseas in a couple days. Libraries need to stress that they provide services to all members of the university community not just to the teaching faculty and the students.

Finally there is the important issue of a library component written into a development proposal or one that grows out of a recognized need once a project is in progress. Librarians can provide valuable assistance through collecting information and participating in proposal writing. They may also directly participate as consultants going abroad, setting in place a core collection and bibliographic awareness tools in a university library overseas, and then establishing in place a system of document delivery for this library which will be an ongoing service. Even though providing information to those who in turn provide information to the developing world is important as is assisting those from the developing world who arrive on our campuses, endeavors which give access to information directly to communities in the developing world should be our highest priority.

University of Minnesota, St. Paul Campus Libraries

The University of Minnesota, St. Paul Campus Libraries have recently introduced CD-ROM technology to the Institut Agricole et Veterinaire Hassan II, Morocco. This is a three part

project: (1) A technology specialist set the equipment in place, installed five CD-ROM databases, and provided technical training to local staff. (2) A librarian followed and trained staff in database use, research strategies, user education, and outreach. (3) A document of agreement was signed by the University of Minnesota Libraries and the Centre de Documentation at IAV to implement continuing cooperation and support through document delivery, joint research in the use of CD-ROM tools, and professional liaison activities.

CD-ROM technology has been greeted enthusiastically as a nearly perfect information medium for lesser developed countries (LDCs). CD-ROM discs have huge storage capacity and are easily portable. They can store bibliographic files, full text, as well as numeric files and visual images. The data is permanently encoded. The discs are extremely stable and not susceptible to scratches or blows. Tropical temperatures, high humidity, dusty conditions, insect pests, and power outages found in many LDCs do not affect CD-ROM as they would printed materials, though these conditions can certainly affect a microcomputer work station. CD-ROM users are not dependent on expensive and undependable telecommunication lines to access data files. Donor agencies are becoming convinced of their utility and funding their installation as part of development projects. In addition, microcomputers and CD-ROM drives continue to drop in price. I had no doubts about their value as I prepared for my trip to Morocco.

I naively assumed that I'd easily be able to locate materials that I could use in my preparation and that I could share with librarians in Morocco. Yet I encountered problems, some of which are the result of an embarrassing ethnocentricity. I wanted to provide both basic information about using CD-ROMs for the local librarians and tools that they could use when introducing CD-ROM to users and, most important, I wanted the documentation in French. I started by writing the producers of the databases we would be installing. Since these files are touted as the solution to Third World information problems, I assumed that the producers would have overview information available in French and Spanish and also some sort of general retrieval software users' guide in these language. Both producers told me that their databases were in English and that their users didn't need anything other than English manuals and guides.

This attitude surprised me! I can drive a car regardless of where it was made, but I'd be hard pressed to grasp operating concepts or solve problems if the only owner's manual was in Japanese or Swedish. Database users can understand the contents of a citation, but they are not in the most comfortable position to develop searching skills or solve problems when the only documentation is in their second or third language. CD-ROM producers are manifesting an unfortunately narrow view of the rest of the world.

I was able to locate some general information in French for CD-ROM users by writing academic and research libraries in French-speaking Canada and in France. I also collected information about two CD-ROM databases (SESAME and PASCAL) produced in France. These tools also helped me build my French vocabulary so that we could discuss possible problems and solutions once I began working with the librarians in Morocco. Library and computer jargon are not easily found in dictionaries nor are they a usual element in language courses.

I also wanted information that would help me work with the librarians in planning user education. I wanted guidance in handling the particular problems that might accompany transplanting this technology to other cultures. I found a critical lack of information in the literature which is filled with articles addressing CD-ROM use in developed countries and when LDCs are mentioned the articles concentrate on the CD-ROM's value rather than on practical aspects of introducing them. Jane Kinney Meyers has written the most useful articles, based on her three years developing a network of libraries in Malawi. She has the hands-on experience of a practitioner and an intimate understanding of needs and consequences.

Successful introduction of CD-ROM technology requires understanding the environment into which it is being introduced. Consultants must understand the institutional culture and society. Articles written by and for those who participate in international development initiatives stress cultural sensitivity and are extremely helpful in preparing for a consulting trip to an LDC. But, because donor agencies have only recently recognized the importance of libraries and documentation centers in development, there are limited sources of information that deal with introducing sophisticated information technology.

It is too simplistic for the western world to simply present CD-ROMs as a universal panacea for information isolation. We need to make it easier for our colleagues in LDC's to utilize the power of this technology. We must recognize that all cultures are not the same - we must sensitize each other so that we are better prepared to work within that culture, to share our skills in an empathetic way.

Despite these problems, this project in Morocco has been extremely successful. This is due in large part to the professional library staff at the Centre de Documentation and their eagerness to learn about and maximize these new tools. The St. Paul Campus Libraries support the use of the CD-ROMs by a document delivery service. The requests from the Centre come to us as actual printouts so verifying the citations and deciphering someone's handwriting are not problems. We are able to supply the documents faster and at less expense than the British Lending Library, and even though we do not go

outside our collection to obtain documents, we are able to supply 93% of the requests. Providing physical access to the information is a positive reinforcement, building on the intellectual access provided by the CD-ROM databases.

Results/conclusions:

1. Libraries and documentation centers here and abroad must sell themselves to the international development community and must be perceived as places where consultants, materials, and services useful to development will be found. Concomitantly, the development community must ask for and take advantage of the many and varied resources available through libraries.

2. New technologies provide increasingly greater access to information, but not all technology is suitable nor is all information relevant. Control over much of the technology and information rests with First World vendors who may very likely be insensitive to the cultures, needs and funding realities of LDCs.

3. Researchers in developing countries who have found a bibliographic reference to certain material must then have access to the full-text article or book upon request. CD-ROM databases open doors to vast worlds of information but in themselves usually do not contain the actual information. Basic collections on site, inter-library loan, and document delivery systems must accompany CD-ROMs.

4. Researchers in developing countries need not only access information but should also be able to contribute their experiences and knowledge to this body of literature for access by the more developed world as well as other developing countries. Another whole paper could be written on this subject.

5. Everything costs money! Dr. John Hayman in a recent article about bridging the technology gap in Africa, mentioned that Africa's share in the world's total expenditure on informatics is about 0.3%. He refers to a survey of 30 difference African universities in 21 countries where over 1200 respondents identified a shortage of funds as the greatest problem facing them in trying to enter the electronic information world. The products, hardware, software, and contents often come from the First World, with First World prices. Ongoing support for systems in terms of trained personnel, hardware maintenance, software upgrades, and document delivery will be costly and problematic.

Educational importance: "Access to information" provides sustainability in development initiatives.

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CONSTRAINTS TO AND THE POTENTIAL OF INDIA'S FARM SCIENCE CENTERS (KRISHI VIGYAN KENDRA-KVK) AS RURAL INSTITUTIONS FOR AGRICULTURAL AND RURAL EDUCATION.

By

V.G. Dhanakumar and J. Lin Compton*

INTRODUCTION

Among the developing countries, India had an early lead in the area of training. The necessity for organizing higher training for farmers was felt as early as 1959 at the Annual Conference of Community Development. In the year 1974, the Indian Council of Agricultural Research (ICAR) established Krishi Vigyan Kendra-(KVK-Farm Science Centers) as innovative institution for vocational training of farmers/villagers and field level extension functionaries. Unlike other training programs, the KVKs conduct training which incorporate hands-on learning by rural inhabitants. By now, there are 105 KVKs in and the government has plans to develop 338 more so as to have one KVK in each of India's 443 districts. A district in India has a population of 1-2 million people, 80 percent or more of whom live in rural areas. In essence, the KVK movement is regarded as India's major investment in providing educational services for its rural population. The National Commission on Agriculture (1976) recommended the establishment of three KVKs per district by 2000 A.D.

PURPOSE AND OBJECTIVES

This paper is focused on developing a better understanding of how KVK are organized and managed, the quality of educational programs, how KVKs are linked with client communities, the result/impact of KVK training and how these dimensions interact. This paper also aims to promote a better understanding of the dynamic forces currently affecting the relevance and effectiveness of the KVK as an institution for rural adult education, and to expand knowledge about institution-building theory, especially as applied to educational development.

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METHODOLOGY

This study was exploratory, descriptive, and analytical in nature and utilized both qualitative and quantitative data. Deductive and inductive (grounded theory) approaches were used to guide the data collection. Principles of open systems theory were employed to structure the analysis of KVKs functioning as rural extension education institutions. Data were collected from a random sample of 199 villagers/farmer respondents(men, women, youth, and village leaders). All trainers and chief training organizers (CTO) of 11 KVKs (attached to state agricultural universities, central research institutes, and non-governmental organizations) in four states of India were selected for face to face interviews. Each KVK had a dozen scientific/technical staff belonging to different fields of specialization based on local training needs. At the time of data collection only 61 out of 132 training staff in the 11 KVKs were available for response; the rest were either on leave or inservice training or had resigned their positions. Some KVKs had kept their positions vacant for administrative reasons.

Multivariate (monova), univariate (anova), chi-square, component analysis (factor analysis), univariate "F" tests, and post-hoc tests were used to determine the extent of variance among the three types of KVK in relation to a number of analytical themes.

Demographics of Sample Population:

Trainers: Of those KVK trainers who responded to the survey, 80 percent were men. The average age was 37.7 years: the youngest was 22 years old, while the oldest was 67. Nearly 83 percent were married, with a family size ranging from two to seven members and averaging four. The trainers surveyed had amassed impressive academic credentials. Fully 52 percent of them had the M.S. degree, 38 percent had the B.S., 16 percent the PH.D., and just 4 percent a diploma. The majority (64 percent) indicated that they had grown up in rural areas. The remaining (26 percent) were from town and only 10 percent were from cities.

Trainees: Of those who responded to the survey, 71 percent were men. The average age of respondents was 36.5 years. The majority were married, with an average family size of 5.8. Out of 199 farmers, 21.7 percent had a primary level of education, 18.9 percent elementary, 17.9 percent secondary, 12.3 percent were illiterate, 11.3 percent had pre-university education, 7.5 percent had the B.S. degree, 1 percent held the M.S., and 1 percent had a formal training diploma. For 78 percent, farming constituted their primary occupation; the rest were in business. The average length of farming experience was 19 years. The size of farms ranged from one to 99 acres, the average size being 1.9 acres.

Findings and Discussion

KVKs differ from one another with respect to several institutional variables which were treated in this study as a sub-themes of four major themes are presented in the Table 1-4. **Organization and management** encompassed staff recruitment, job assignment, program planning process, staff retention and turn over, and administrative decision making. **Quality of educational process** encompassed training needs assessment, curriculum development, trainers' teaching styles, transferring of information, farmers' learning styles, and timing and duration of training. **Linkage with client communities** included the nature and frequency of contact between KVK staff and villagers, the nature and extent of grassroots level participation in decision-making regarding KVK activities, and village leadership effectiveness in organizing community involvement in KVK activities. **Training results and impact** encompassed evaluations of trainees perceptions and expression of satisfaction with the training received, testimony regarding the results of training at the village level, and the nature of methods used for evaluating the impact of training.

1. Organization and Management:

1.1. **Differences are noted in recruitment procedures of the KVK**. The main criterion used for selection of KVK trainers across the KVK is formal educational qualifications. The methods used vary according to the type of KVK, the host organization, and also according to the level and temporary or permanent nature of the trainers' posts to be filled.

1.2. The **emphasis in job assignment for KVK staff** is on training rural adults in agriculture and rural development. However, the three agencies studied differ in regard to goals/objectives, philosophy, and commitments. The job assignments at the university-based KVKs are made on the basis of standardized job classifications (such as need-based training, transfer of technology, provision of improved seeds, plants, etc.) with an emphasis on creating self-employment for rural people. Particularly striking is the special attention given to integrating community needs, research, extension, and technology transfer as a tool for job assignment. Both ICAR and NG-KVKs exhibit a similarity in their goals which are based on their institutional philosophy and commitments. The job assignments at ICAR-KVK are based on the specialties of staff and on research requirements. The NG-KVKs, on the other hand, are probably in a better position to make their job assignments so as to reflect the priorities of the people and the institutions. Regardless of KVK type, the staff indicated that they had to depend on their supervisors for approval of assigned work, and they did not have much freedom to make decisions about their jobs.

1.3. **Program Planning:** In general, the program planning process in KVKs is based primarily on village level surveys, pro forma details, cropping season assessments, and previous staff experience with the needs of clients. The university KVKs focus their program planning on cropping seasons data and the assessment of community needs; the ICAR-KVKs tend to use their institutes' objectives and research needs as a basis for program planning; and the NG-KVKs plan their programs based on cropping seasons and on the needs of clients. The extent of client involvement in the program planning cycle is greater in NG-KVKs. Mainly, university KVKs use Local Management Committee (LMC) members' suggestions to determine the content and schedule of their programs.

1.4. The eleven KVKs studies offer contrasting perspectives on the relationship of the locus of the **decision-making process** to the design and implementation of KVK training programs. In university and NG-KVKs, the process of decision-making and the planning of training programs are focused on achieving the commitment, participation, and acceptance of program goals by a small number of selected individuals. Local leaders and other progressive members of the community have very little influence on the process. The second phase of decision-making is more interactive between CTO and LMC members. In ICAR-KVK, the first phase takes place at the village level and relies on local leaders. The second phase of decision-making is more interactive between the CTO and the Director of the institute. The locus of decision-making in most KVKs is top management. There is a notable absence of participation by the target population and KVK staff. The KVK management's emphasis is on the technological and economic aspects of development decision-making rather than on social consequences. This approach seems to increase the dependency of those (community) who must implement programs on those who decide the nature of these programs. A problem with this approach has been "resistance," the tendency of people to reject decisions made and imposed by others.

1.5. **The retention of KVK staff** is as important as its recruitment. The majority of the trainers interviewed in the survey indicate a readiness to change jobs. Research institutes are likely to retain more KVK staff, followed by the university, and then the NG-KVK.

2. Quality of Education:

2.1. The data suggest that **needs assessment**, as it pertains to training and other aspects of development programs, is conducted in different ways. The assessment procedures that are practiced by the KVKs generally are: village surveys, discussions with clients, and reliance upon past experience of staff concerning clients' needs in regard to the subject matter to be taught. However, the training needs assessment process stops as soon as a training program starts.

2.2. The degree of involvement of farmers/villagers in the **curriculum development process** is negligible. The majority of the

trainees interviewed in the survey indicate a preference for joint decision-making (trainer and trainees) on training topics and curriculum development. Often the training curriculum is revised on a yearly basis by the CTO, staff, and LMC members. Villagers consider that the training curriculum should have a problem-solving orientation rather than focusing on subject matter and/or high-tech production.

2.3. **Teaching and learning transactions** at KVKs are based on the concept of science simplification and on the principle of "learning by doing" methods. This research reveals that most appropriate learning activities for rural people/farmers are "learning by doing," not classroom instruction. Villagers-trainees tend to absorb what they see rather than what they hear; therefore, lectures should contain some simulation exercises. Practical demonstrations and lectures cum demonstration cum discussion are the most preferred learning styles of the trainees. Trainees revealed that non-participatory, non-polite, non-individualized teaching, long lectures, and the lack of small group discussion are obstacles to the trainees' learning objectives.

2.4. Differences are noted in the extent of trainee-farmers' involvement in **transferring the information** acquired from training to non-trainee farmers. The extent of trainees' transfer of gained information to non-trainees is greater for ICAR-KVK trained farmers than for others. This observation suggests that when farmers with rich experience in a particular area of farming worked with staff/scientists of KVK with a similar field of specialty their learning interest is enhanced, and subsequently, they are more likely to transfer their knowledge to fellow farmers.

3. LINKAGES WITH CLIENTS COMMUNITY:

3.1. The main concern of this theme is the **nature and process of linkages of the KVK and the community.** The analysis revealed that the selection of villages for training and development activities is based primarily on village level survey details conducted by the KVK staff. The staff tend to select as villages for KVK activities mostly those with an approximate population of between 100 and 4000. The data reveal that the KVK staff generally cover a maximum of 10% of the population at the selected villages. During their visits, 49% of staff meet mostly with either small/marginal farmers and/or a group of people in the villages. The rest of the staff indicate that they meet village leaders (15%), farm women (13%), farmers interested in KVK activities (8%), and past trainees (8%); the rest (13%) never has an opportunity to meet their clients at all.

3.2. The three types of KVKs studied differ with regard to the **nature and frequency of contact between KVK staff and villagers**. The ICAR and university staff tend to select villages with the help of such government agencies as the department of agriculture and rural development, and the block development office. KVKs also often obtain help from such local associations as farmers' discussion groups, the village panchayat, and local

organizations for selecting villages and trainees. In the case of NG-KVKs, UPASI and Mitraniketan generally involve different agencies of the government in many types of activities, but not in the selection of villages or villagers for KVK programs. One reason why the NG-KVKs involve their own staff fully in the selection process may be that they believe such involvement helps them select the right clients for KVK activities. It is important to note the researcher's observations at the KVK-Agricultural Science Foundation, where the staff wants to select villages on their own for political reasons. Their foundation leaders, however, tend to ignore the staff in selecting villages and villagers.

3.3. The **frequency of farmers' contact** with KVK staff is either mostly monthly, once in a fortnight, or once in 3 months. However, a little less than 10% of university client farmers and over 10% of farmers from ICAR-KVK feel that they meet staff at once-a-year intervals. The reason may be that KVK staff, during their visits to villages, generally meet a particular group or person continuously until the end of the program, because most of their programs focus on a target group of socio-economically backward persons, such as small and marginal farmers, landless laborers, and scheduled tribal and backward castes. Therefore, staff regard these categories of clients as their target groups for development rather than targeting a community or village as a whole for agricultural and rural development.

3.4. **Institutionalizing a local social organization** is an effective means for promoting popular participation in agricultural and rural development, for it provides a structure within the community itself wherein the basic needs of the people are fulfilled. The data analysis reveals that 63% of KVK trainees/villagers feel that they did not have any local organization to promote KVK-village linkage activities. The rest feel that the KVK tends to promote its educational activities through farmers' organization(s) (24%), farm science clubs (5%), village/panchayat councils (3%), and youth clubs (5%). The university KVKs have a unique strategy for entering village communities and developing agricultural and rural development programs. University-KVK staff tend to begin their linkage activities initially by contacting village leaders, farmers' discussion groups, and progressive farmers in order to identify the problems, needs, and resources of the villages, and to establish rapport with the people. Popular participation occurs during the initial planning (by way of discussion) and during implementation.

Research institute KVKs, on the other hand, begin the linkage process by having progressive farmers, leaders, and government agencies identify their clients in their own fields of specialization. Subsequently, their trained clients promote the pursuit of institute-oriented objectives by similar groups of clients in their communities. In the case of NG-KVKs, once they bring a traditional village into their program, village leaders, youth clubs, and other organizations are sought out for discussion

and negotiation. The villagers are then reorganized into functional committees such as a village development unit/tea growers association. Later those units work with the KVK to promote agriculture, rural, and community development activities.

3.5. The **village leader's role** in the NG-KVK, as compared with that in ICAR and university KVKs, is effective in integrating agencies into development work and in reviewing the impact of KVK training programs.

4. TRAINING IMPACT

4.1. **Evaluation of Training Programs**: It seems that the KVK trainers primarily evaluate the trainees' knowledge rather than their skills and attitudes. However, the university-KVKs make profound efforts to evaluate clients' skills, notably with respect to skill development through the observation of practical demonstrations. They perceive that KVKs are a grassroots level vocational training institution, designed to bridge the gap between the availability of technology and its application for increased production. Therefore, the university-KVK tends to verify clients' skill development through the concept of "learning by doing," by which the trainees are helped to learn the technology at the field level. On the other hand, ICAR-KVK evaluates clients' skills more than do the NG-KVK, because the research institutes' requirements motivate them to either study or know the results of research-based innovations. The NG-KVK approach is neither academic nor scientific, but rather generalists, emphasizing community development. Therefore, they have not pursued research or evaluation on KSA to the same degree as have the other KVKs.

4.2. The emphasis in the staff's choice of **methods for assessing the impact of KVK training** is on measurement of trainees' crop yields, discussions with groups of farmers, evaluation surveys, and input from local councils. University-KVKs evaluate the impact of training more frequently than do other KVKs. On the other hand, NG-KVK assess the impact of training by considering the quality of life of trainees in general as a result of training. However, they primarily use crop yields and discussions with farmers as assessment tools. The number of assessment methods is lower for the ICAR-KVK than for the other two types of KVK. The ICAR-KVK frequently assess the trainees' crop yields through impact surveys and discussions to verify the impact of training about research-based innovations.

4.3. An examination of the **results of training programs** across KVKs reveals that ICAR-KVKs succeeded in improving the knowledge levels of trainee farmers in agricultural technology of the institutes' own fields of specialization and development to a higher degree (92%) than did the University/NG-KVKs. However, ICAR-KVKs are not able to increase trainees' skill and income more than university-KVKs. In the case of the university, trainees' knowledge, skills, and income increased as a result of training: 86%, 93%, and 36%, respectively; for NG-KVKs, these levels are 73%,

98%, and 16%, respectively; and for ICAR-KVKs the levels are 92%, 76%, and 23%. Overall, the level of income increase for trainees is lower for all KVKs than are the knowledge and skill gained as a result of training. NG-KVKs are able to increase the average crop yields and income levels of past trainees' villages more significantly than other KVKs. Nearly 70% of the NG-KVK farmers held this opinion.

CONCLUSIONS

Krishi Vigyan Kendras (KVK) are relatively new institutions. At the same time, their number has multiplied dramatically, the first being established in 1974 with now approximately 105 in existence. This study obviously does not represent last word on India's KVK or on rural institution-building in extension education. Certainly replication of the study (or aspects of it) in other sites in need to solidify the empirically based findings of this investigation.

Currently existing KVKs have many strengths and, through their educational activities, are making many contributions to the rural villages which will need to be addressed in the years ahead. Of utmost importance, is the design and use of strategies for promoting client participation in decision-making regarding the structure and content of training programs, the nature of their implementation, the identification and mobilization of community-level human resources for participation in training programs, and overall program evaluation. Furthermore, KVK administration needs to coordinate program activities more closely with other local organizations, both government and non-government, and incorporate their inputs into the KVK efforts. Overall, the KVK approach to training needs to shift from a technical information dissemination or impetus to a more human-centered, problem-solving focused, and location specific orientation.

EDUCATIONAL IMPORTANCE

This research aimed to promote a better understanding of the dynamic forces currently affecting the relevance and effectiveness of the KVK as an institution for adult and extension education, and to expand knowledge about institution-building theory, especially as applied to educational development. It is anticipated that this research findings will have unearthed and have made available to training practitioners a rich source of theoretical concepts for testing and verification within their respective (and unique) locales.

TABLE 1. Trainers Perspective on Functioning of Organisation and Management Aspects Among Three Types of KVKs

Variables	No of Variables Used	Overall Significant Differences Across Three	Significant Differences Among Three KVKs
1.Budgeting Process*	(10)	.0728NS	N/A
2.Chief Training Organizer (CTO) Leadership Style $	(13)	.3357NS	N/A
3.Decision Making Process*	(19)	.0005*	(2-1)
4.Job Assignment*	(31)	.0005*	(3-1), (3-1)
5.Job Motivation*	(18)	.2002NS	N/A
6.Job Satisfaction*	(16)	.0929NS	N/A
7.Program Planning Process*	(39)	.0005*	(3-1), (3-1)
8.Retention & Turnover of KVK Staff@	(01)	.0135*	N/A
9.Staff Inservice Training$	(04)	.4723NS	N/A
10.Staff Recruitment	(10)	.0005*	N/A

TABLE 2. Trainers and Trainees's Perspective on Educational Process Dimensions Among the Three Types of KVKs.

TRAINERS PERSPECTIVE:			
1.Training Needs Assessment Process*	(18)	.0037*	(2-3)
2.Curriculum Development Process*	(37)	.0058*	(3-1),(3-2)
3.Teaching Style of Trainers*	(30)	.0005*	(1-2),(2-1),(3-1)
VILLAGERS/FARMERS PERSPECTIVE:			
1.Transferring of Information (trainees to fellow farmers/villagers)*	(04)	.0005*	(3-2)
2.Curriculum Planning with Clients*	(31)	.0002*	(1-3),(3-2)
3.Villagers/Farmers Learning Styles*	(34)	.0005*	(1-3), (3-2)

TABLE 3. Trainers' and Trainees' Perspective on Functioning of KVK-Community Linkage Among the Three Types of KVKs.

TRAINERS' PERSPECTIVE:			
1.Nature and Frequency of Contact Between KVK Staff and Villagers *	(25)	.0030*	(3-2)
TRAINEES' PERSPECTIVE:			
2.Grassroots Level Participation:			
A.Frequency of Trainees' Contact With KVK Staff*	(17)	.0250*	(2-1)
B.Frequency of KVK Staff Contact with Villagers*	(24)	.0660NS	N/A
C.Established Local Organisation for Linkage Between KVK & Community*	(10)	.0030*	(3-1)
3.Villagers' Role in Extension Education*	(36)	.1730NS	N/A
4.Village Leadership Effectiveness in Community Development*	(17)	.0300*	(3-2)

TABLE 4. Trainers' and Trainees' Perspective on Evaluation of Training Results/Impact Across KVK.

TRAINERS' PERSPECTIVE:			
1.Evaluation of Trainees*	(13)	.0048*	(3-1)
2.Methods Used for Evaluating the Impact of Training Programs*	(16)	.0029*	N/A
TRAINEES' PERSPECTIVE:			
3.Results of Training at Village Level*	(18)	.0005*	(1-2),(3-2)

@ Univariate (Anova) + Multivariate Analysis (Manova)
$ Chi-square * <.05 Level Significance

( ) Numbers (1-3) within the parentheses indicate the types of KVKs for which there were significance differences among three types of KVK (Scheffe Intervals).

1- University Based KVK
2- ICAR Central Research Institute Based KVK
3- Non-Governmental Based KVK

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THE POTENTIAL CONTRIBUTION OF MARKETING CONCEPTS FOR IMPROVING THE EFFECTIVENESS OF INTERNATIONAL DEVELOPMENT EXTENSION EDUCATION PROGRAMS

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Introduction

In 1969 an active debate among marketing academicians pertained to broadening the concept of marketing. That is, prior to this time marketing was popularly viewed as the sole domain of product oriented businesses. During that year Kotler and Levy (1969) at Northwestern University published what is now considered in marketing circles to be a landmark article. They provided convincing support for marketing's contribution to the sale and distribution of more broadly conceived "products" such as services, organizations, candidates, or more abstractly - ideas. In the early 1970s the term "social marketing" evolved for what is now known as marketing for the "benefit of the target audience and the general society" (Andreasen 1990, p.6). As with product marketing, social marketing is viewed as a philosophy (customer orientation), a process (for behavior change), and a set of key concepts and tools.

During the last decade (social) marketing methodolcgy has been increasingly accepted by domestic and international development donors as a viable process for achieving behavior change in a target audience. A review of existing literature reflects numerous health sector applications (nutrition, child immunization, contraception, disease prevention) in both the U.S. and in developing countries. Donors such as the Centers for Disease Control (Schwartz, 1991), National Cancer Institute (Sutton, 1991), the World Bank (Favin & Griffiths, 1991), UNICEF (McKee, 1991), and USAID (SOMARC 1990; HEALTHCOM, 1992) have supported these endeavors. The literature reflects a definite health sector bias. Only one agriculture sector application has been documented, that of the USAID funded Communications for Technology Transfer (CTTA) project which operated from 1985 to 1991 in Peru, Honduras, Indonesia and Jordan (Mata, in press).

Though applications have been rare in non-health sectors, the apparent utility of social marketing methodology is beginning to fuel, albeit somewhat slowly, expanded use. This is evidenced by two recent environmental sector projects - an EPA/American Forests funded domestic urban forestry research project (Andreasen and Tyson, 1992) and the soon to be initiated USAID funded internationally based GREENCOM project. Perhaps marketing methodologies have something to offer agriculture extension educators; perhaps extension educators can expand their repertoire of skills by selecting concepts from marketing that complement their interests.

Purpose

The purpose of this paper is to share with extension specialist members of the AIAEE a review of (possibly) relevant marketing literature. The paper begins by explicating a marketing philosophy and describing how this might pertain to the work of extension educators. Next, marketing concepts with potential relevance to extension education are investigated: a) exchange theory, b) segmentation strategies, and c) consumer behavior analysis. Conceivable points of interest to agriculture extension educators are highlighted. There are no overt conclusions posited. The purpose of the paper is to raise potentially valuable questions based on information outside the established paradigm of extension education, ie. to bring possibly foreign yet relevant information into the arena of consideration.

Statement

A Marketing Philosophy

Kotler and Andreasen (1991), in their book *Strategic Marketing for Nonprofit Organizations*, define marketing management as "the analysis, planning, implementation, and control of programs designed to create, build and maintain beneficial exchange relationships with target audiences for the purpose of achieving the marketer's objectives" (p.38). It is the last phrase, "achieving the marketer's objectives", that is the spring board to our discussion on marketing philosophy.

Kotler and Andreasen (1991) describe four possible orientations that marketer's might adopt. The chosen orientation generally reflects the objectives and underlying philosophy of the marketer. One could adopt a **product orientation**; that is, an egocentric belief in a product's worth. A second approach might entail a **production orientation**; a belief that low cost and efficient production and distribution are the keys to success. A third involves a **sales orientation**; a belief that the best competitor or persuader will win. The forth deals with a **customer orientation**; the belief that those who best determine the perceptions and needs of the target markets and pattern their activities so as to satisfy these needs are those that are most apt to be successful. Today, it is the latter type of orientation that one finds the more progressive marketers emphasizing. That is not to say that product quality, production and distribution efficiency, and persuasion are downplayed, only that a customer orientation is highlighted. This mindset best encapsulates modern day marketing philosophy - "a willingness to adjust any of the marketing mix elements (product, price, distribution, promotion) to satisfy the customers needs and wants" (Houston, 1986, p.86).

At this point readers may be saying to themselves, "yes, though the jargon is different, all of these orientations pertain to extension education; a customer orientation is one we also emphasize and one that has been widely discussed." Yet, though this is the underlying theme of many extension models, ie. efficient technologies developed and distributed based on local needs and characteristics, it is apparent from the extension literature that this remains a perennial issue. Too frequently we continue to hear of extension endeavors failing to diffuse a technology to farmers at sustained levels because of what could be termed their product, production or sales orientations. The same can be said of many failed product lines and businesses.

As with marketing strategies for learning more about the customer, extension strategies often employ infusion, bottom up, participatory strategies for gaining insight into farmers' ways. This information is used to guide aspects of technology (product) development and diffusion (promotion). The goal of marketers, as with extension specialists, is to have the customer (farmer) enter into an exchange relationship whereby a product (technology) is bought (adopted) and each party benefits from the transaction. In the case of the farmer (customer), benefits may be conceptualised as increased crop yields or improved livestock; in the case of the civil servant extension specialist (marketer), benefits may be derived by the society they represent; in the case of the private sector extension specialist (marketer) benefits may be in the form of cash profit and repeat purchase. Perhaps the task for extension educators and marketers alike is to formulate the product in a way that this mutually beneficial exchange process is expedited; perhaps this is best accomplished by adopting a mindset closely aligned with our modern day marketing philosophy.

Exchange Theory

Exchange, defined as a mutually beneficial transaction, is probably the flagship concept of marketing. Kotler (1972) holds that exchange relationships "involve two or more parties who are potentially

interested in exchange, each possessing things of value to the other(s), and each capable of communication and delivery" (p.13). In optimal situations the exchange is a *quid pro quo*, equitable transaction.

Bagozzi (1975) identified two forms of exchange - utilitarian and symbolic. **Utilitarian exchange** is based on tangible benefits such as when a product or service is traded for money, time, or effort. **Symbolic exchange** refers to intangible factors such as social and psychological benefits. In many exchange relationships the two forms are mixed and hard to delineate as in the case of the farmer and extension agent who exchange effort for assistance which translates into social and/or economic benefit for both parties.

Bagozzi went on to define three types of exchange: restricted, generalized and complex. **Restricted exchange** refers to a reciprocal transaction between two parties (A <-> B). In this type of exchange there is an attempt to maintain an equal give and take relationship as between an extension agent and farmer. In **generalized exchange** there may be three or more players each giving to another until the originator reaps their due (A -> B -> C -> A). A classic extension example would be an agent giving service to a farmer who provides products to society which in turn provides salary and support for the agent. **Complex exchange** is when three or more parties are linked by reciprocal arrangements (A <-> B <-> C). An example of this is when research and extension staff exchange information followed by extension staff and farmers doing the same, ie. the farmer and research staff exchange information via extension. Generalised and complex exchanges of both symbolic and utilitarian forms are common occurrences in social marketing and extension situations.

In an earlier article Bagozzi (1974) identified a series of endogenous and exogenous variables that are posited to possess a moderating influence on the exchange process. These variables help define cause:effect relationships in the exchange structures just described. Examples of **endogenous variables** which may affect the perceptions of either seller or buyer toward a potential exchange include perceived availability of resources, magnitude of profit/loss (risk), source expertise, and efficacy of the act. Examples of **exogenous variables** include established policy, organizational objectives, and social norms.

At this point, readers may be rehearsing something to the effect of "the exchange forms and structures described have a somewhat intuitive appeal and the relevant endogenous and exogenous variables, though termed differently, are familiar moderators of extension programs". Perhaps exchange theory can provide extension educators with a model helpful in conceptualising the causal link between the society, the farmer, extension and research staff; and perhaps the concept of endogenous and exogenous moderating variables may be helpful in defining the nature of these relationships.

Market Segmentation Strategies

A well established concept in marketing involves audience segmentation. It is a concept that extension educators may also find intuitively appealing. Segmentation strategies allow marketers to target their efforts in environments of extreme diversity. Marketers and extension educators realise that traditional demographic approaches provide insufficient information; that the needs, attitudes, and perceptions of audience members effectively moderate reactions to marketing and extension efforts. Market segmentation variables include: geographic and demographic criteria, perceived needs and wants, values and beliefs, social class, family life cycle, usage rates, resource availability, normative factors, knowledge factors, etc. (Andreasen, 1990).

Kotler and Andreasen (1991) posit three strategic purposes for segmenting markets: **quantity decisions**, how much effort and resources to devote to each segment; **quality decisions**, how each segment should be approached (market mix considerations - product, price, distribution, promotion); and **timing decisions**, when each segment should be approached. They go on to detail criteria for evaluating the viability of a segment. Each segment should be a) **mutually exclusive**, conceptually distinct from one another; b) **exhaustive**, all potential members included; c) **measurable**, a clear profile can be formed; d) **accessible**, effectively reached and served; e) **substantial**, large enough to warrant the effort; and **f) differentially responsive**, respond in a unique manner relative to other segments.

Kotler and Andreasen (1991) also provide a description of three broad strategies that might be followed by marketers in targeting their audience. One might be an **undifferentiated strategy** whereby an effort is made to go after the whole market with one offer and one market mix. Here the marketer is trying to attract as many customers as possible. In essence this strategy does not segment the market. The second and third strategies are generally more effective. A **differentiated strategy** targets several segments each with a unique offer and marketing mix. A **concentrated strategy** targets one segment with one ideal offer and market mix.

Undifferentiated segmentation strategies, for humanitarian, political and financial reasons, are often rationalised as the best strategy in social marketing and extension education contexts. For instance, in projects aimed at improving the health status of children (or the production status of farmers) it is often difficult for the host country, donor, or implementing agency to idealistically or politically rationalise giving differential advantage to a narrow segment of the population, ie. follow a concentrated segmentation strategy. Yet, undifferentiated strategies are often not very effective. Further, differentiated strategies aimed at large numbers of people are generally not economically feasible given the limited nature of many project budgets. This issue presents a challenge to social marketers and extension educators alike, that of convincing the host countries and donors to better frame their humanitarian and political concerns or more adequately fund projects so as to allow more effective efforts within whole communities.

A different type of audience segmentation issue uniquely relevant to social marketers and extension educators is best explained by example. A review of two USAID funded social marketing projects, the HEALTHCOM project dealing with child survival (Rasmuson, Seidel, Smith, & Booth, 1988) and the CTTA project dealing with small holder agriculture production (Mata, in press) both identify strategies for dealing with primary, secondary, and tertiary audiences. A primary audience is defined as those who it is hoped will perform the promoted behavior, eg. child's guardian, a family, or a farmer. A secondary audience is comprised of those who influence the primary audience, eg. health workers, community leaders, extension agents, and researchers. A tertiary audience is comprised of those who can make or break a project, eg. political leaders, policy makers, financial supporters, and input suppliers.

Concern for the primary audience is generally the driving force behind extension educators' and social marketers' efforts, and rightly so. Yet, it is undoubtedly obvious that attention to secondary and tertiary audiences can be a vital key to success. Perhaps the marketing concepts we just discussed for a) deciding which segments to target based on the required quantity, quality, and timing of efforts, b) evaluating the viability of segments based on the six criteria offered, and c) employing differentiated or concentrated strategies (when applied to these primary, secondary and tertiary audience groups) will prove helpful to extension educators; perhaps when faced with the

task of focusing efforts so as to achieve the most effective results in the most efficient manner, these audience segmentation concepts can serve as a useful guide.

Consumer Behavior Analysis

Probably one of the best known techniques in marketing circles for predicting behavior change from attitudes was that posited by the theory of reasoned action (Fishbein & Ajzen, 1975). This theory operationalizes attitudes as the sum of various weighted beliefs about the proposed behavior. It posits that attitudes can accurately predict an individual's intentions when the proposed behavior is volitional. A review of marketing literature provides ample evidence of the theory's predictive ability and a review of two recent meta-analyses (Kim & Hunter 1991a, 1991b) provides ample support for the correspondence between attitude and behavior intent ($r = .79$) and behavior intent and behavior ($r = .82$).

Another widely cited "expectancy value" type model often used in social marketing contexts is one entitled the "health belief model". This model, the formal structure of which is credited to Rosenstock (1974), posits the predictive effectiveness of perceived severity and susceptibility of a problem (illness) and the barriers and benefits of a response (Janz and Becker, 1984).

In early 1992 an "intellectual summit" of leading cognitive psychologists was held in Washington D.C. their aim was to identify the basic variables they could agree serve as effective predictors of behavior (Andreasen, 1992). The objective was to provide theoretical support for the design of future campaign interventions. Eight variables were identified: intentions, skills, environmental constraints, anticipated consequences, norms, affect, self-concept, and self-efficacy.

Empirical testing of a model which attempts to address these eight factors in two environmental contexts (urban forestry and recycling) is now being initiated (Andreasen and Tyson, 1992; Tyson, 1992). The proposed model is somewhat unique in that a) it is not tied to volitional behaviors; b) it is a systems model, behavior is treated as a dynamic; and c) it does not predict one proposed behavior, it predicts a range of behavioral alternatives that fall within a persons latitude of acceptance.

Perhaps attitudinal variables associated with health behavior may prove relevant when a person considers the "health" of their environment, farming enterprise, or family's welfare; perhaps consumer expectancy value models and the associated attitudinal variables can prove useful to extension educators when considering how to develop and promote interventions.

Conclusion

Conceivable points of interest to agriculture extension educators as relates to marketing concepts have been highlighted. As previously stated the purpose of the discussion was to raise potentially valuable questions based on information outside the established paradigm of extension education. Due to the limited scope of this discussion only a few concepts have been dealt with. Other possibly relevant marketing concepts certainly exist.

Three others that immediately come to mind worthy of brief mention include: a) **product differentiation**, techniques for formulating products so as to stimulate customer demand which can be employed as a compliment to audience segmentation (which holds demand constant) (Dickson and Ginter, 1987); b) **competitive advantage**, which deals with "generic competition" - alternative behaviors competing for the same individuals' resources (Johnson, 1984), and "agency competition" - other agencies who

are competing for the attention of the same target audience (de la Paz, 1992); and c) **staged models of purchase behavior** which provide a handy heuristic upon which to order thinking and a theoretical structure for empirically testing the ideal nature of an intervention per various adoption stages (Prochaska and DiClemente, 1983; Smith and Elder, 1991).

Educational Importance

It was the author's intention to bring possibly foreign yet relevant information into the arena of consideration. As with most professional and academic disciplines we all stand guilty at times of taking on a too narrow perspective. Marketing as a discipline and its associated literature may provide us with fresh outlooks and a potentially relevant set of new information. It is up to the audience to weigh what has been presented and decide how this information may be used. The author would be very interested in corresponding with any audience members interested in pursuing this challenge.

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Printed Name: ROGER E. STEELE	Organization: Winrock International
Address: R#3 Petit Jean Mountain Morrilton AR 72110	Telephone Number: (501) 727-5435 x254
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Author(s): Gh. Pezeshki, Edgar P. Yoder and James E. Diamond	
Corporate Source: Penn State University	Publication Date: March, 1993

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Printed Name: Gholamreza Pezeshki	Organization: Penn State University
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Author(s): Daniel B. Sherrard	
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Printed Name: Daniel B. Sherrard	Organization: Iowa State University
Address: Department of Agricultural Education and Studies Iowa State Univ. Ames Iowa 50011	Telephone Number: (515) 294-9623
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Author(s): Carol A. Conroy, Okechukwu M. Ukaga	
Corporate Source: The Pennsylvania State University	Publication Date: 3/18/93

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Author(s): Ibrahim N'Diaye and Layle D. Lawrence	
Corporate Source: West Virginia University	Publication Date: March, 1993

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Printed Name: Edgar P. Yoder	Organization: Dept. of Ag & Extension Education
Address: Room 320 Ag. Administrations Bldg. Penn State University University Park, PA 16802	Telephone Number: (814) 863-7852
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Author(s): Robert A. Martin & Adewale Alonge	
Corporate Source: Iowa State University	Publication Date: March 1993

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Author(s): HENRY M. BARTHOLOMEW, ASSOCIATE PROFESSOR, THE OHIO STATE UNIVERSITY	
Corporate Source:	Publication Date: MARCH 1993

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Author(s): OKECHUKWU M. UKAGA & RAMA B. RADHAKRISHNA	
Corporate Source: THE PENNSYLVANIA STATE UNIVERSITY	Publication Date: 3/19/93

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Title: Attitudinal Barriers to Implementing Change in Agriculture in the Former Soviet Union	
Author(s): Amy Keith McDonald	
Corporate Source: Texas A&M University	Publication Date: 3/18/93

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Printed Name: Amy Keith McDonald	Organization: Texas A&M University
Address: Department of Journalism Texas A&M University College Station, Te	Telephone Number: (409) 845-4611
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Title: Working Together: Alternative Approaches to Technology Development and Adoption in Agriculture	
Author(s): David G. Acker Larry S. Lev	
Corporate Source: Association for International Agricultural and Extension Education	Publication Date: March 1993

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Title: Title XII Coordinators' Perceptions Regarding Sustainable Agriculture	
Author(s): Lydia Ori and Barbara A. Holt	
Corporate Source: Louisiana State University	Publication Date: 03-17-93

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Title: A framework for incorporating indigenous knowledge systems into agricultural extension organizations for sustainable agricultural development in India	
Author(s): B. Rajasekaran, Robert A. Martin and D. Michael Warren	
Corporate Source: Iowa State University	Publication Date:

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Title: Reaching Malawian Smallholder Farmers with Agricultural Extension Programs: A Case for Increased Use of Women-Farmer Groups	
Author(s): Vickie A. Sigman, Catherine Chibwana, Isabel Mateyo	
Corporate Source:	Publication Date: March 1993

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I. DOCUMENT IDENTIFICATION:

Title: Collaborating with Industry to Design Agricultural Curricula: A Case Example from Jamaica	
Author(s): James McKenzie & Satish Verma	
Corporate Source: Louisiana State University	Publication Date: March 1993

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Signature:	Position: Vice President (Research & Extension
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Title: Preparing African Agricultural and Extension Educators to Meet Future Challenges: An Analysis of University Programs in Kenya, Tanzania, and Swaziland	
Author(s): R.E. Steele; C.A. Onyango; K.J.B. Keregero; B.M. Dlamini	
Corporate Source:	Publication Date: 18 MARCH 1993

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Author(s): J. David McCracken, Ana Falcon-Emmanuelli, and Zakaria Kasa	
Corporate Source: 1993 Association for International Extension Education Conference, Arlington, VA	Publication Date: March, 1993

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Printed Name: J. David McCracken	Organization: The Ohio State University
Address: Department of Agricultural Educ. 208 Agricultural Administration 2120 Fyffe Road, Cols, OH	Telephone Number: (614) 292-0202 Date: February 25, 1993

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Author(s): Barbara G. Ludwig	
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Title: Internationalizing Agricultural Curricula: Are We Teaching The Concepts In Our Secondary School Agricultural Programs?	
Author(s): Don O. Ibezim, J. David McCracken, and Janet L. Henderson	
Corporate Source: 1993 Association for International Agricultural and Extension Conference, Arlington, VA	Publication Date: March, 1993

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Author(s): ① Kamal ALi Elbasher ② Robert A. Martin	
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Title: Access to Information: Library Support for International Development	
Author(s): Anne Fox + Peggy Johnson	
Corporate Source: OREGON STATE UNIVERSITY	Publication Date: 3/18/93

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Author(s):	V.G. DHANAKUMAR and J. LIN COMPTON
Corporate Source:	Publication Date:

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Author(s): C. BENJAMIN TYSON	
Corporate Source:	Publication Date: Feb. 1993

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Author(s): Stephen P. Jones	
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Printed Name: Stephen P. Jones	Organization: Minnesota Extension Service
Address: 199 Coffey Hall 1420 Eckles Ave, University of Minnesota St. Paul, MN. 55108	Telephone Number: (612) 625-1287 Date: March 9, 1993

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